FERGUSON

Videostar VHS

Video colour Camera

3V06

SERVICE MANUAL

Video colour Camera

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SERVICE MANUAL

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PRECAUTIONS

(1) Avoid any excessive mechanical vibration or impact during installation and transportation.

Excessive impact suffered by the vidicon may result in damage to the target surface or deterioration of the optical system.

(2) When installing the camera on a tripod, securely tighten all screws.

(3) Never use the camera where extremes of temperature, humidity or magnetic field might be experienced.

(4) Never use the camera where direct sunlight might strike the lens.

Direct sunlight and bright subjects of high illumination intensity may cause permanent damage to the vidicon.

(5) When cleaning the lens, use a soft brush to remove any deposited dust and dirt.

If necessary, lightly wipe the lens with a soft cloth moistened with alcohol.

(6) When the camera is not in use, replace the protective lens cap.

When the vidicon is exposed to even a weak light for a prolonged period, the vidicon may be permanently burnt. To prevent this, replace the lens cap. Always store the camera with the lens attached.

1. INTRODUCTION

The Ferguson Videostar Model 3V06 Camera is a portable, self-contained, single tube colour camera for video systems application, designed for direct connection use with the Videostar portable VHS PAL Recorder Model 3V01. The optional AC Adaptor Model 3V07 facilitates use of the camera with a non-portable recorder, Videostar Model 3V00 or 3292.

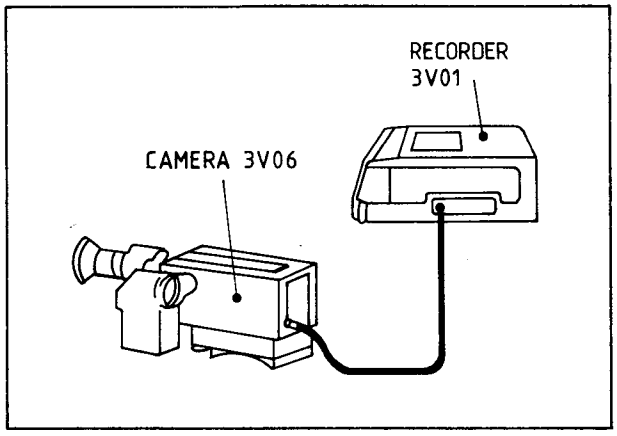


Fig. 1.1 Direct Connection to Recorder Model 3V01

The pick-up tube is a 1 inch vidicon, similar to the vidicon used in black and white video cameras, which additionally incorporates a colour stripe filter. Colour separation is by means of a 'virtual step energy' decoder system, which employs both frequency and phase multiplexing techniques.

The camera control circuits are mounted on printed circuit boards housed within the camera body. The camera has automatic aperture control and is equipped with an electronic viewfinder to aid picture composition and provide video monitoring facilities for 3V01 playback. The camera is also equipped with a built-in high sensitivity condenser microphone and facilities for connecting an external microphone.

The camera additionally features:

* automatic 'over' and 'under' indicators for manual aperture control
* indicators to display 'recording' and 'low battery'
* a video tape recorder (VTR) start/stop switch
* a 6X (17.102mm), f2 macro zoom lens (C mounting) with automatic aperture control and manual override
* a compartment for housing rechargeable batteries or dry cell batteries for optional battery operation.

The camera weighs approximately 3.7kg (8.25 lbs) and operates from a nominal 12V power source.

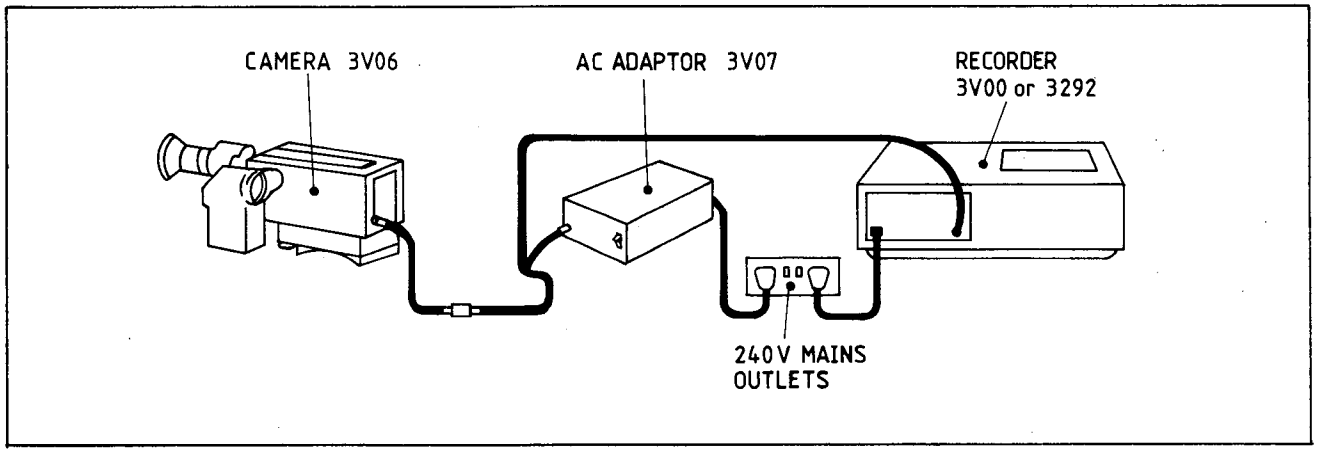


Fig. 1.2 Connection Using AC Adaptor 3V07 to Recorder Model 3V00 or 3292

2. DATA SUMMARY

2.1 SPECIFICATION

Image pickup tube	25mm (1 inch) vidicon with special type stripe filter
Image pickup system	PAL type output, virtual step energy decoder system
Signal-to-noise ratio	Luminance: better than 40dB Chrominance: better than 30dB (at 2000 Lux (190fc), 3200K)
Minimum applicable illumination	100 lux (9fc), 3200K, f/1.8
Horizontal resolution	More than 230 lines
Vertical resolution	More than 300 lines
Synchronizing system	625 lines, 2:1 interlace
Video output	1V p-p into 75Ω (PAL system)
Audio output	−20dB low impedance
Microphone	−64dB high impedance, non-directional condenser type
Lens	6X (17 to 102mm (0.67 to 3in)) f2 macro zoom lens (C-mount) with automatic iris control and manual override
Colour temperature	Preset to 3200K (without filter)
Colour correction filter	58mm (2.3in), screw type 85 (for outdoor use) — adjusts colour temperature to 6500K
Electronic viewfinder	38mm (1.5in) display with OVER/UNDER indicators, RECORD and low battery indicator
Camera cable	3 metre (10ft) for direct connection to 3V01 portable VTR, to apply camera power requirement
Power requirement	12V to 14V d.c. (usually supplied from VTR) AC adaptor 3V07 (option) provides +12V d.c. from a 110/200/220/240V a.c. 50Hz mains supply for non-portable VTRs
Power consumption	12W
Temperature	0° to 40°C (32° to 104°F) ambient
Camera dimensions	Height: 208mm (8in) Width: 174mm (7in) Depth: 382mm (15in)
Camera weight	3.7kg (8.25lb)

2.2 LIST OF EQUIPMENT (Model 3V06)

ITEM NAME	ITEM No.
Body	3V06A
Battery Case with Grip	3V06B
Zoom lens	3V06C
Electronic Viewfinder	3V06D
Filter	3V06F
Camera Cable	01X0-016-214

2.3 OPTIONAL ACCESSORIES

ITEM NAME	ITEM No.
AC Adaptor	3V07A*
Camera Cable	3V07B*
Extension Cable (10 metres)	3V08B
Tripod	3V11
Carrying Case	3V12

* Items 3V07A and 3V07B comprise one package

3. MECHANICAL DESCRIPTION

3.1 THE CAMERA

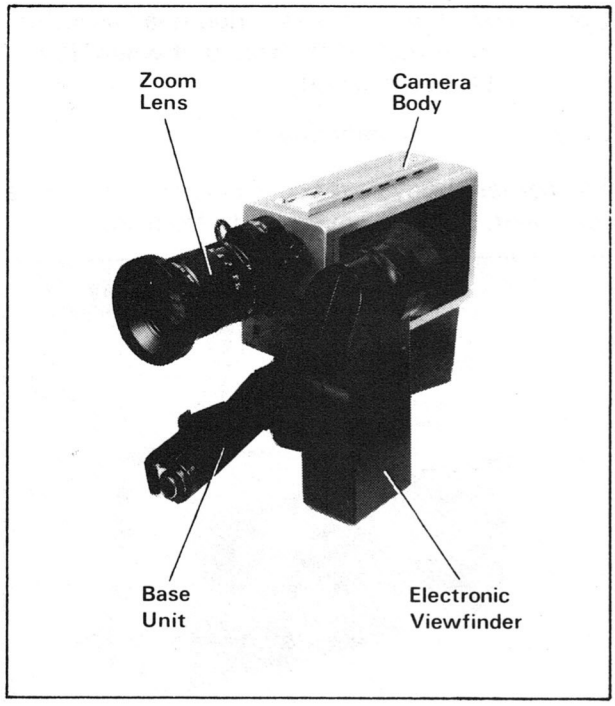


Fig. 3.1 Component parts of the Camera

As illustrated by Figure 3.1, the four component parts of the camera comprise

(1) the camera body, housing the vidicon and printed circuit board (PCB) mounted circuits, and mounting all of the operating controls

(2) a base unit comprising a combined microphone / handgrip / battery case assembly, housing a high sensitivity microphone and optional rechargeable or dry cell batteries

(3) the zoom lens assembly, comprising a zoom lens with automatic iris control mechanism, zoom ring to vary focal area, and focus control ring

(4) an electronic viewfinder, containing a black and white picture tube which displays the output of the camera and also operates as a monitor for playing back cassettes, and incorporating visual displays of over/under aperture opening, VTR start/stop and battery low conditions.

3.1.1 Camera Body

① Mounting bush for zoom lens, normally fitted with a dust cap when the zoom lens is not in position

② VTR switch used to start and stop the video recorder when the camera is used with a model that has remote pause

③ Socket for plug connection from zoom lens iris control

④ Socket for plug connection from electronic viewfinder

⑤ AGC switch used to control the automatic sensitivity circuits

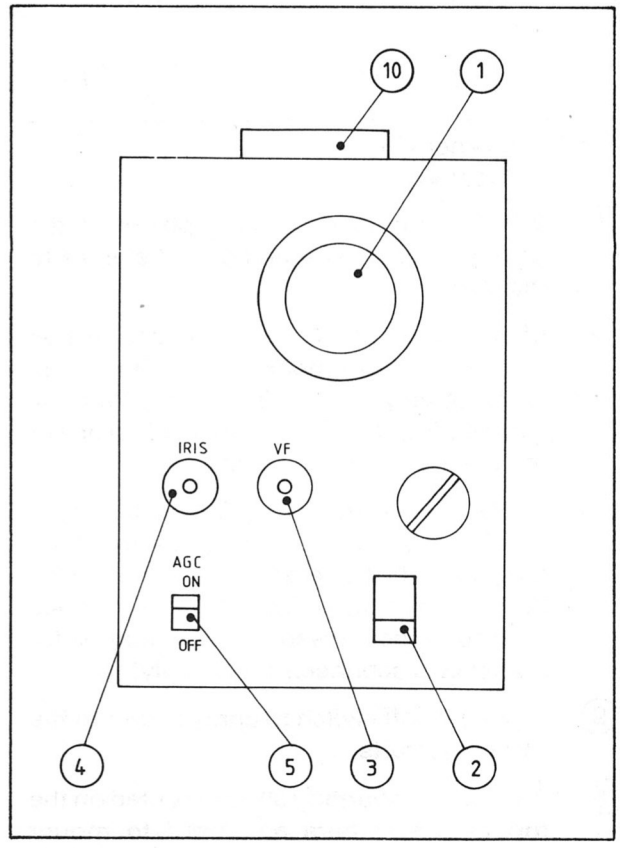


Fig 3.2 Camera Body
Front View

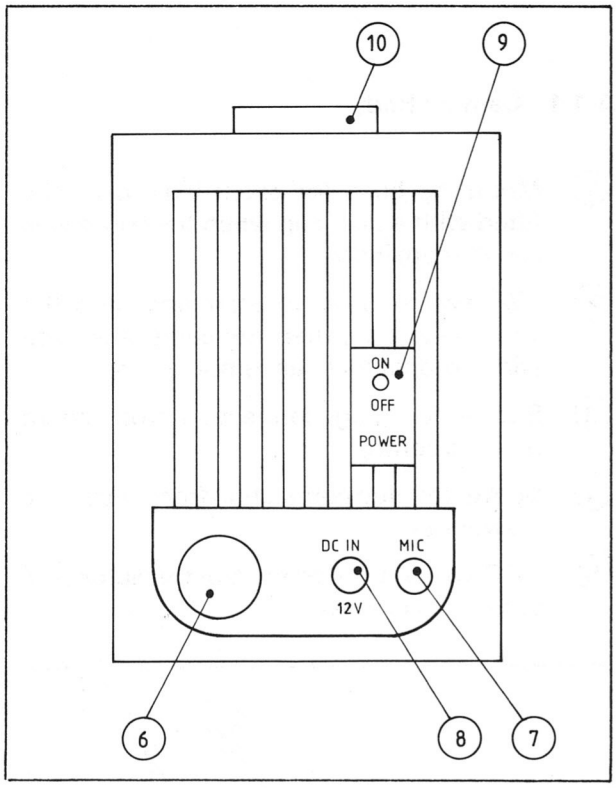


Fig 3.3 Camera Body Rear View

⑥ 12-pin connector, carrying power to the camera and picture and sound signals to the VTR

⑦ Microphone socket for plug connection from the microphone in the hand-grip (alternatively a type 3V15A microphone can be plugged into the socket in place of the self-contained microphone)

⑧ DC IN 12V socket for plug connection from the battery supply (this plug must be removed when operating the camera from the power supply from the VTR or AC Adaptor since inserting the plug automatically disconnects this supply)

⑨ Power on/off switch to apply power to the camera circuits

⑩ Accessory mounting shoe mounted on the top of the camera and used to mount standard photographic accessories such as boom microphone

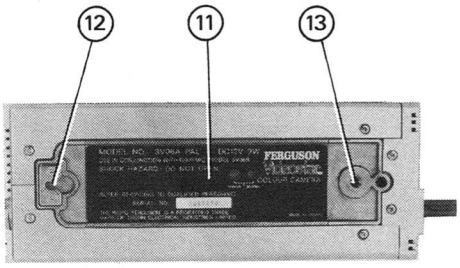


Fig 3.4 Camera Body Viewed from Underside

⑪ Plate bearing camera serial number

⑫ Keyhole shaped slot for positioning a locking pin mounted on the base unit when fitting unit to camera body

⑬ Screw hole to take knurled-head securing screw mounted on base unit when fitting unit to camera body.

3.1.1.1 Camera Body Cover

The camera body cover consists of four pieces, a top cover, two side covers and a front cover.

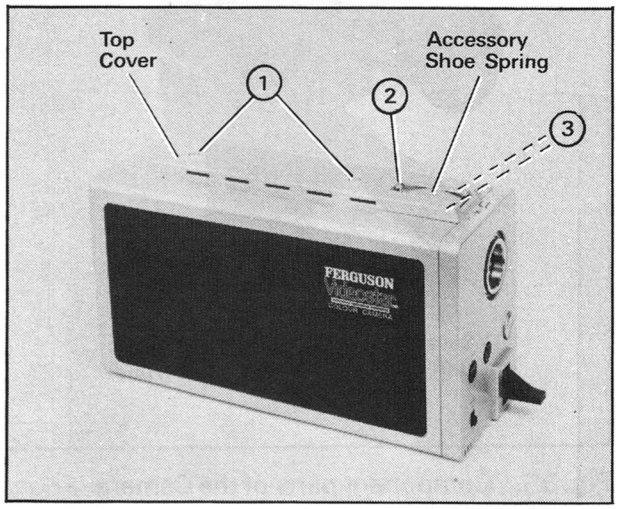


Fig 3.5 Camera Body Top Cover Removal

To remove the top cover

(1) Remove the two screws ① shown in Figure 3.5

(2) Remove the screw ② on the accessory shoe shown in Figure 3.5 to remove the accessory shoe spring

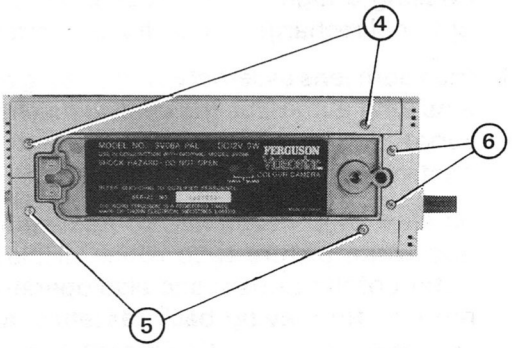


Fig 3.6 Camera Body Base View

To remove the side and front covers

(3) Remove the two screws ③, revealed when the shoe spring is removed, and the six screws ④, ⑤ and ⑥ from the base of the body as shown in Figure 3.6

3.1.1.2 Printed Circuit Boards

The camera body houses the following PCBs

* CA 1501A Video Process
* CA 2001A Pre Amplifier
* CA 4501A Deflector and Power
* CA 5501A Auxiliary
* CA 3501A SGC and Encoder

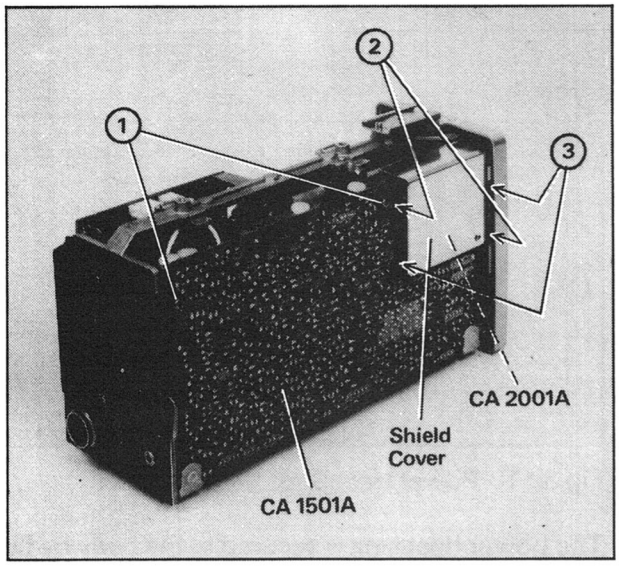


Fig. 3.7 PCBs CA 1501A and CA 2001A

PCBs CA 1501A and CA 2001A are both located on the left hand side of the camera as shown in Figure 3.7.

To remove CA 1501A

(1) Remove the two screws (1) and hinge the PCB outwards and down

To remove CA 2001A

(2) remove CA 1501A

(3) Remove the four screws (2) and (3) to release both the shield cover and the PCB. (When only the shield cover is to be removed, remove the two screws (3) only.)

PCBs CA 4501A and CA 5501A are both located on the right hand side of the camera as shown in Figure 3.8.

To remove CA 4501A

(4) Remove the two screws (4) and hinge the PCB outwards and down. (Removal of the left hand screw (4) results in the earth wire being disconnected. If the camera is to remain operational, the earth wire must be suitably grounded.)

To remove CA 5501A

(5) Remove the two screws (5)

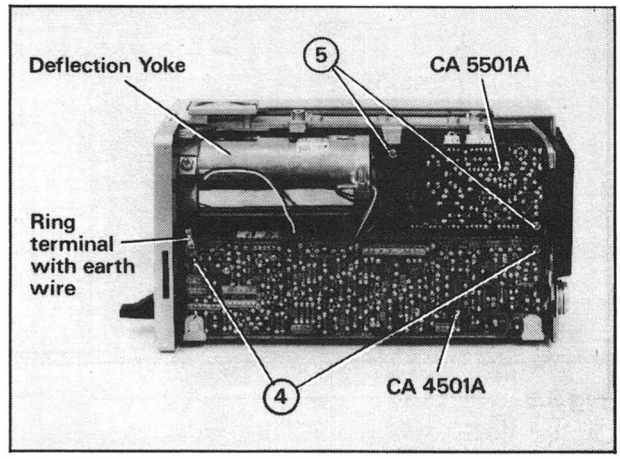


Fig 3.8 PCBs CA 4501A and CA 5501A

To remove CA 3501A

(6) Remove CA 4501A (as in item (4))

(7) Remove by cutting, the restraining harness band shown in Figure 3.9, and withdraw connectors [M] and [G]

(8) Remove CA 1501A as in item (1)

(9) Withdraw the six connectors [B] [H] [K] [L] [N] and [Q] from CA 1501A

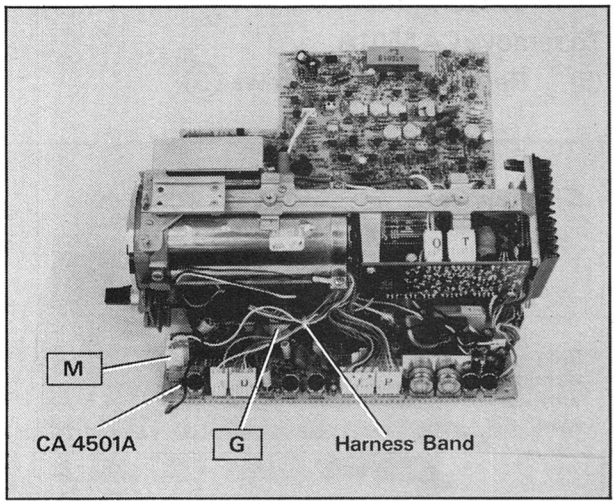


Fig 3.9

To fully remove CA 1501A

(10) Remove the two screws (6) from the hinges located at the bottom of the body as illustrated in Figure 3.10

(11) Remove the screw (7) from the socket assembly as shown in Figure 3.10

(12) Remove the four screws (8) as shown in Figure 3.10 to remove CA 3501A.

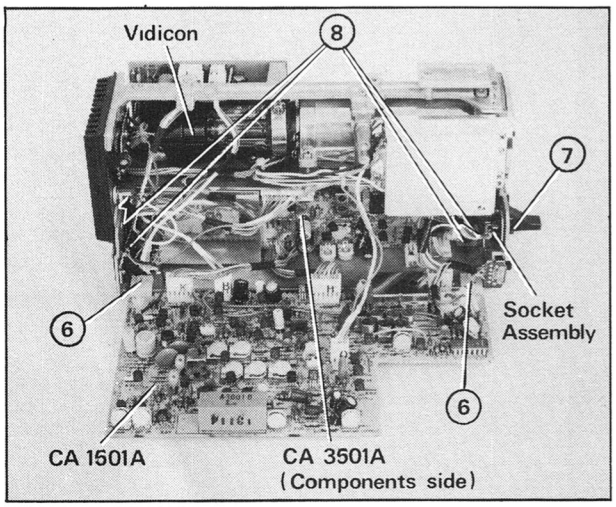


Fig 3.10

3.1.1.3 Power Heat Sink

The power heat sink, shown in Figure 3.11 is equipped with a power regulator, two power transistors, and a power switch for the focus regulator.

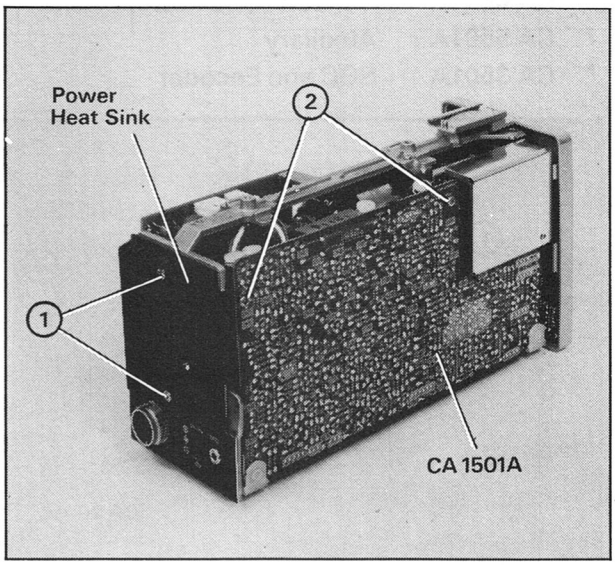


Fig 3.11 Power Heat Sink

The power heat sink is secured to the body by the two screws (1) in Figure 3.11.

To facilitate the replacement of component parts without removing the heat sink, remove the two screws (2) securing CA 1501A and hinge the PCB down.

3.1.1.4 Vidicon

The vidicon is located within the deflection yoke (DY), illustrated in Figure 3.12.

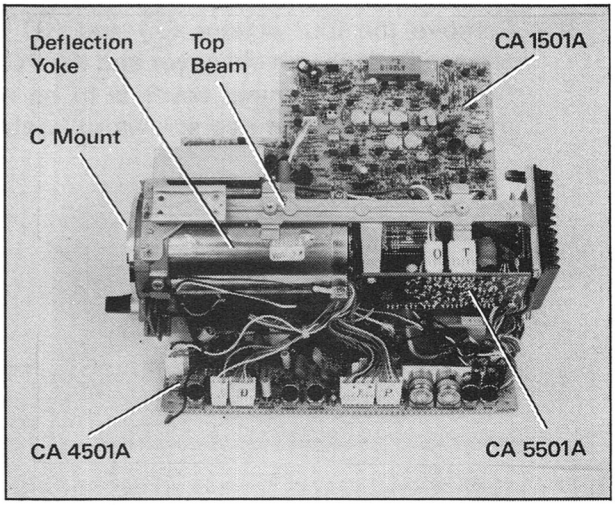


Fig 3.12 PCBs Hinged Down to Show Deflection Yoke

To remove the vidicon

(1) Hinge clear PCBs CA 1501A and CA 4501A, and remove CA 5501A (Fig 3.12)

(2) Remove the four screws (1), shown in Figure 3.13, and remove the C-mount plate

(3) Loosen the screw (2) of the band securing the vidicon socket assembly, shown in Figure 3.14, and using a pushing and turning motion, gently ease the vidicon forward. (DO NOT push the vidicon socket.) When moved forward sufficiently, remove the vidicon socket (3)

(4) Remove the vidicon through the front of the deflection yoke.

When replacing a vidicon, the procedure is in the reverse order to removal. When handling the vidicon, always use a lens tissue and ensure that the vidicon is pushed completely into its seating position.

NOTES 1. When adjusting the vidicon, ensure that the optical black mask is in the lower horizontal position as shown in Figure 3.15

2. When replacing the C-mount plate, ensure that the locating dimple is correctly positioned at the top as shown in Figure 3.18

3. Having replaced the vidicon, carry out the alignment procedure detailed in section 7.2

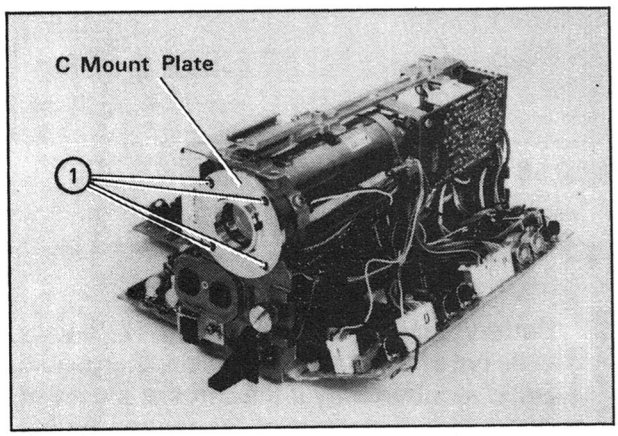


Fig. 3.13 Removal of C-mount Plate

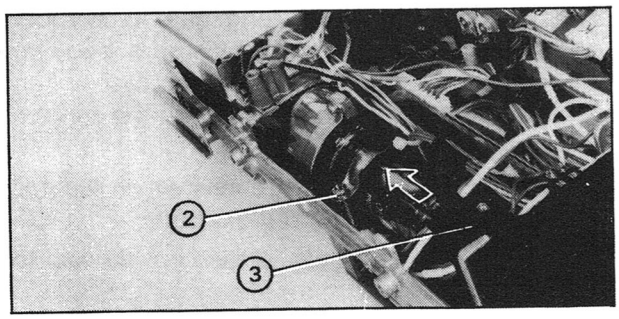


Fig 3.14 Removal of Vidicon

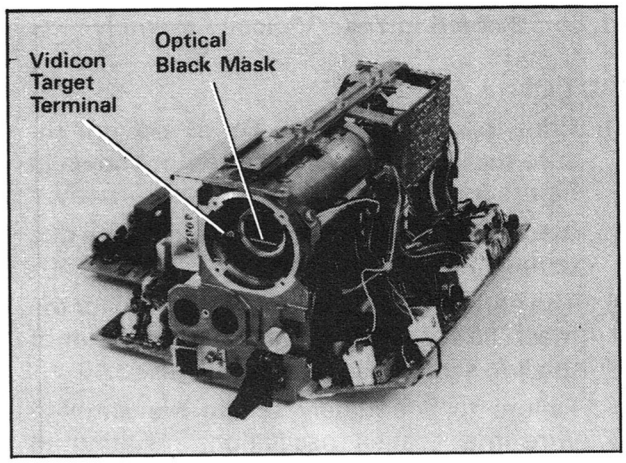


Fig 3.15 Vidicon Position Adjustment

3.1.1.5 Deflection Yoke

The deflection yoke is shown in Figure 3.12. To remove the DY

(1) Hinge clear PCBs CA 1501A and CA 4501A, and remove CA 5501A (Fig 3.12)

(2) Remove the four screws (1), (2) and (3), shown in Figure 3.12, in order to remove the top beam

(3) Remove the vidicon tube socket as described in Section 3.1.1.3

(4) Remove the two screws (4) from the DY band and the single screw (5) from the DY, as shown in Figure 3.16

(5) Remove the four screws (6) from the C-mount plate that retains the lens (Fig 3.17)

NOTE When removing the lens mount, care must be exercised to prevent damage to the filter assembly (optical band elimination filter)

(6) Cut the restraining harness band in order that the connectors [E] and [F] can be withdrawn from PCB CA 4501A

(7) Remove the target output wire, soldered to the vidicon target terminal as shown in Figure 3.15

(8) Remove the DY by withdrawing it backwards

(9) Remove the vidicon through the front of the DY.

3.1.1.6 Deflection Yoke/Vidicon Assembly

CAUTION

(1) Prior to assembling the DY or vidicon, ensure that the mesh-filter capacitor shown in Figure 3.16 is securely bonded to the body.

Inadequate bonding may produce noise due to mechanical vibration.

(2) The earthing wire (ring terminal wire) for the mesh-filter capacitor is secured by either of the two screws (4) shown in Figure 3.16.

Failure to adequately secure the earthing wire may cause oscillation, resulting in unclear pictures.

(3) Remember to solder the wire to the target terminal, as shown in Figure 3.15.

(4) When replacing the lens mount (C mount), ensure that the dimple (Fig 3.18) is correctly positioned at the top.

Replacement of the lens in the wrong position may result in deterioration of the functioning of the optical band elimination filter.

(5) Gather the previously freed wires and fit a new harness band.

(6) Having replaced the DY or vidicon, carry out the alignment procedure (Section 7.2).

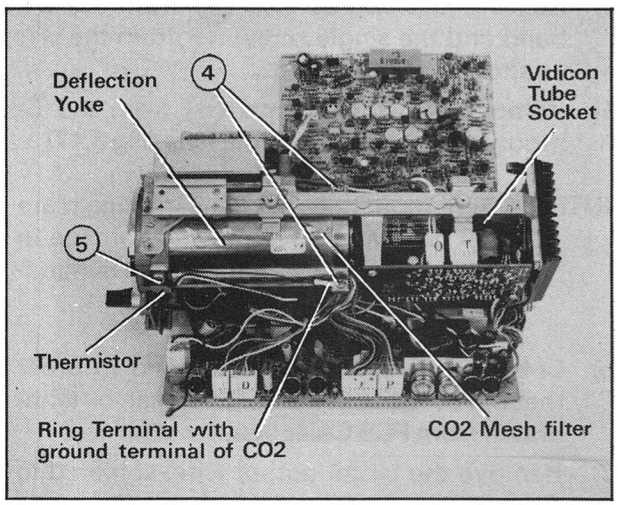


Fig 3.16

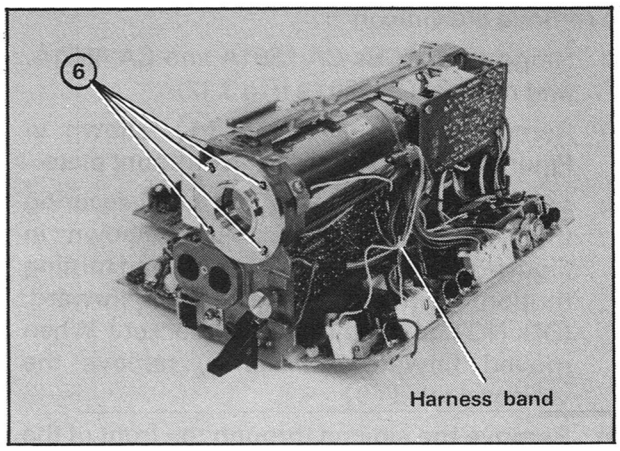


Fig 3.17 Removing the Lens Mount

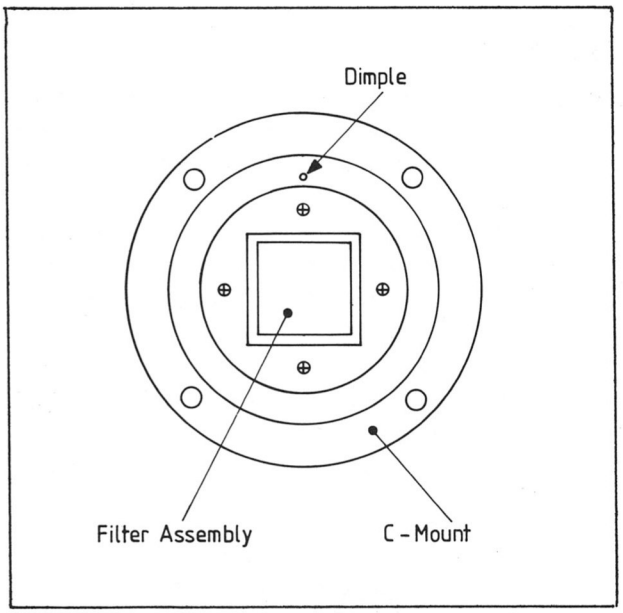


Fig. 3.18 C Mount Lens Mounting

3.1.2 Base Assembly

(1) Battery case used for housing 12 battery cells type MN1400 or suitable rechargeable cells, required only if the camera is used at distances in excess of 30 metres (using three extension leads) from the associated VTR

(2) Locating pin which engages in keyhole shaped slot on base of camera body to correctly position the battery case when attaching the base assembly to the camera body

(3) Knurled-head securing screw which secures the base unit to the camera body

(4) Battery cover plate providing access to battery compartment

(5) Hand grip

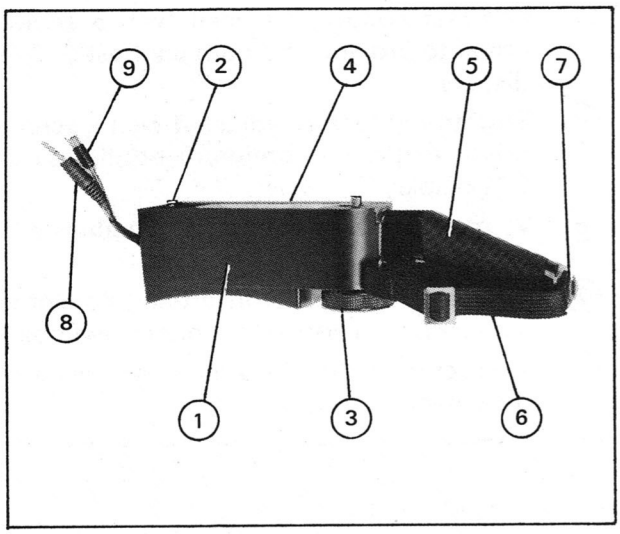


Fig 3.19 Base Assembly

⑥ Wrist strap

⑦ High sensitivity, nondirectional condenser microphone

⑧ Microphone cable and jack attachment plug which plugs into the camera body to connect the microphone housed in the hand grip

⑨ DC cable and jack attachment plug which plugs into the camera body to connect the batteries when the camera is being operated from batteries (the plug is NOT inserted into the DC jack when the camera is employing the AC Adaptor).

3.1.2.1 Battery Case

The battery case cover plate is a clip fit. When replacing batteries, care should be taken to ensure that they are inserted the right way round, as shown in Figure 3.20.

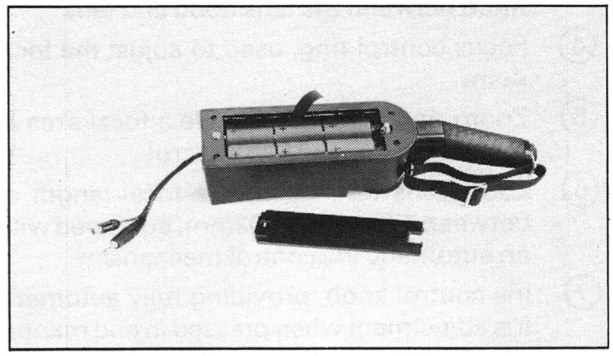


Fig 3.20 Replacement of Batteries

3.1.2.2 Microphone Assembly

The microphone is clamped within the hand grip. To remove the microphone

(1) Remove the four screws ① (Fig 3.21) and remove the assembly top cover

(2) Remove the two screws ② (revealed when the top cover is removed) and ③ (situated on the underside of the hand grip)

(3) Peel back the grip cover until the join between the top and bottom half of the grip is exposed

(4) Lift the top half of the grip clear to reveal the microphone assembly

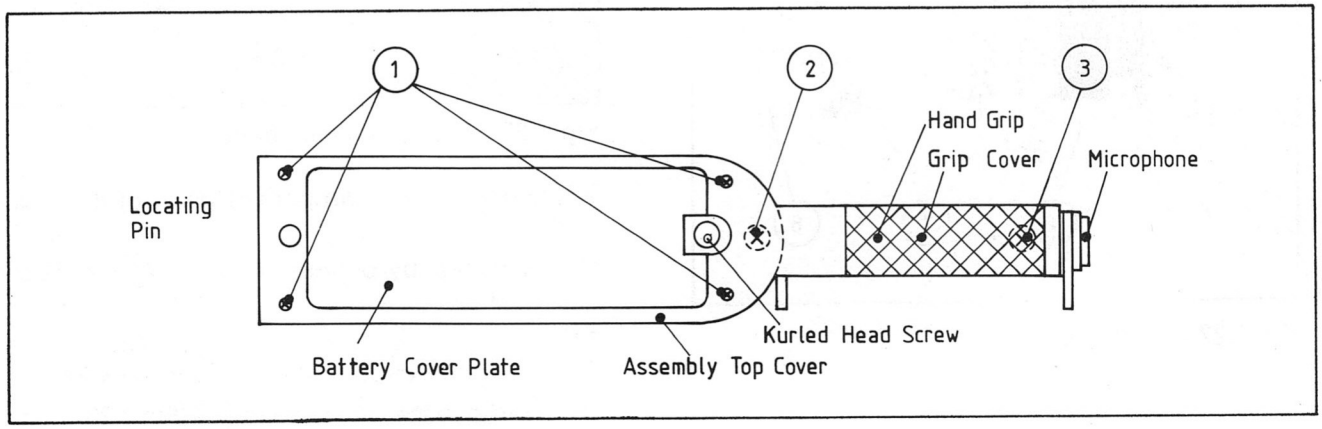


Fig 3.21 Microphone Replacement

3.1.3 Zoom Lens Assembly

① Lens hood cap, to be retained in position at all times other than when the camera is being used.

② Lens hood, providing lens protection

③ Colour temperature conversion filter (6500k) fitted between the lens hood and lens

④ Focus control ring, used to adjust the focal point

⑤ Zoom ring, used to provide a focal area of between 17mm and M (Macro)

⑥ Zoom lens (6X, f2) with a focal length of between 17mm and 102mm, equipped with an automatic iris control mechanism

⑦ Iris control knob, providing fully automatic iris adjustment when pressed in and manual control when pulled out (the pointer on the associated scale indicates aperture selection between f2 and f22)

⑧ Dust cap, to be retained in position at all times other than when the lens assembly is fitted to the camera body

⑨ Iris control cable and plug which plugs into the camera body.

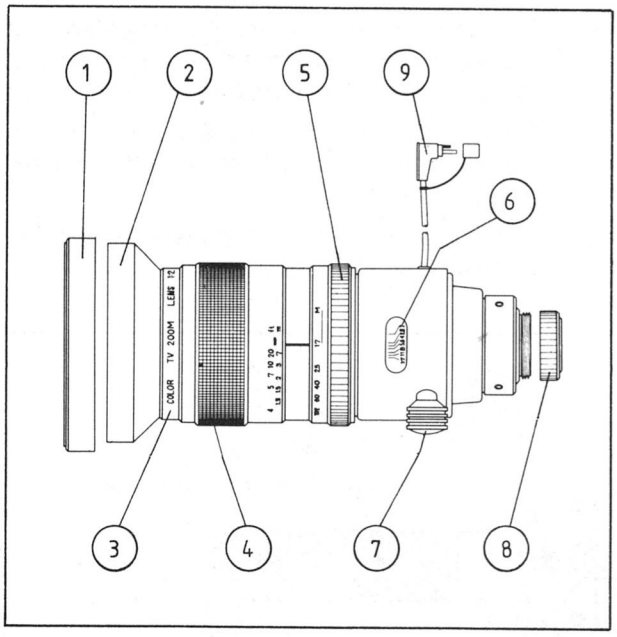


Fig 3.22 Zoom Lens

3.1.4 Electronic Viewfinder

① Visor, which is an expanded push fit over screw collar ②

② Collar, usually concealed by the visor

③ Viewfinder case, housing the viewfinder CRT and associated circuitry

④ Contrast control, adjusted with a screwdriver to provide optimum contrast of CRT display

⑤ Brightness control, adjusted with a screwdriver to provide optimum brightness of CRT display

⑥ VF control cable and plug which plugs into camera body

⑦ Mounting bracket for insertion into slot in camera body in order to mount viewfinder

⑧ Two screws which secure the two halves of the viewfinder case.

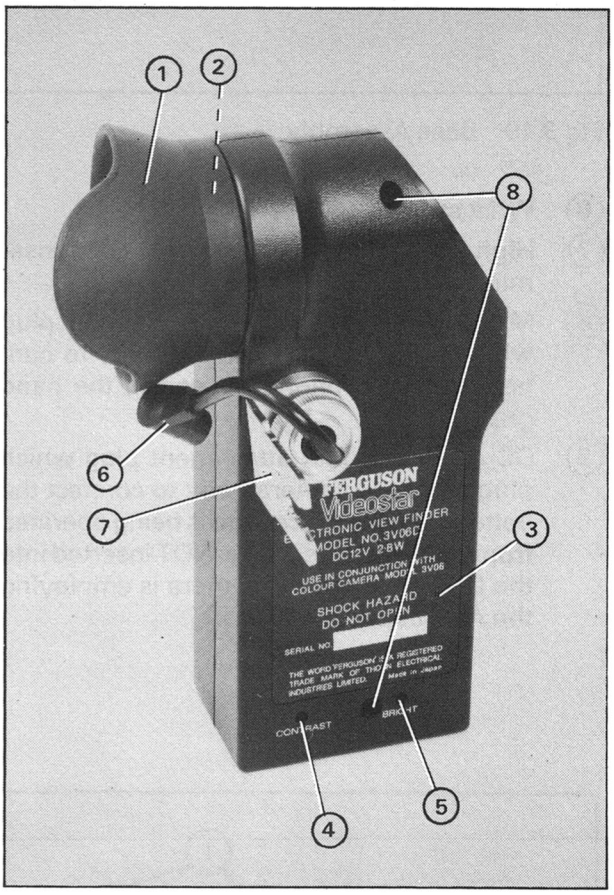


Fig 3.23 Electronic Viewfinder

To dismantle the component parts of the viewfinder

(1) Remove, by pulling, the visor ① in Figure 3.23

NOTE When refitting the visor, position the rim of the visor as shown in Figure 3.23

(2) Remove the two screws ③ (Fig 3.23)

(3) Unscrew the collar ② (Fig 3.23), by turning in the anticlockwise direction, and remove

One complete half of the viewfinder case may now be removed to reveal the component parts of the viewfinder retained in the other half of the case, as shown in Figure 3.24. When removing the one half of the case, care must be taken to prevent the lens from falling from its housing.

Certain repairs and replacements can be effected with the viewfinder in this condition. To completely remove the components

(4) Remove the one screw (9) shown in Figure 3.24 and pull the CRT and PCBs assembly clear.

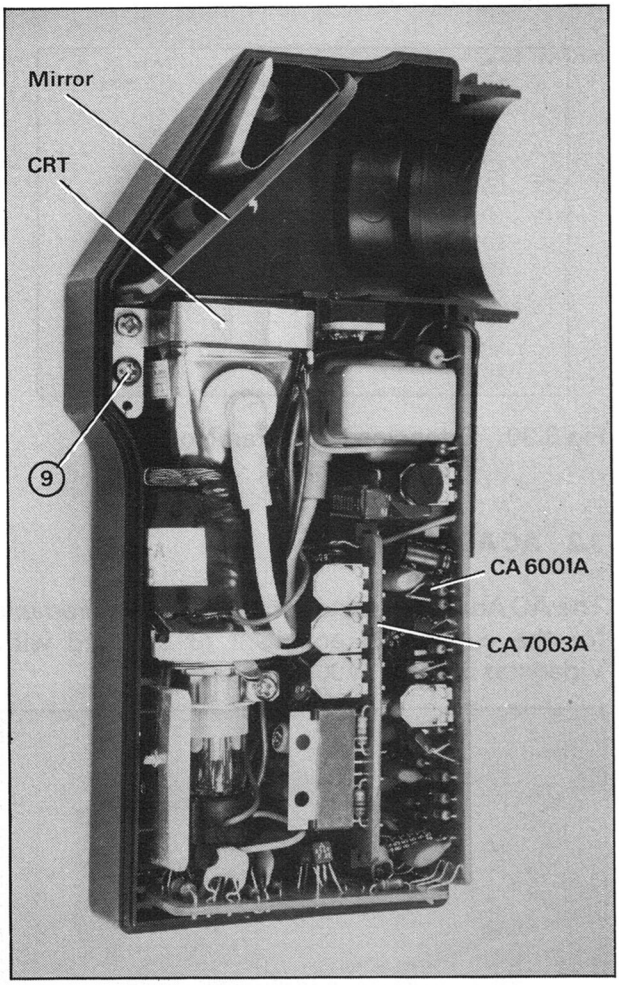


Fig 3.24 Viewfinder with Half of Case Removed

3.1.5 Assembling the Camera

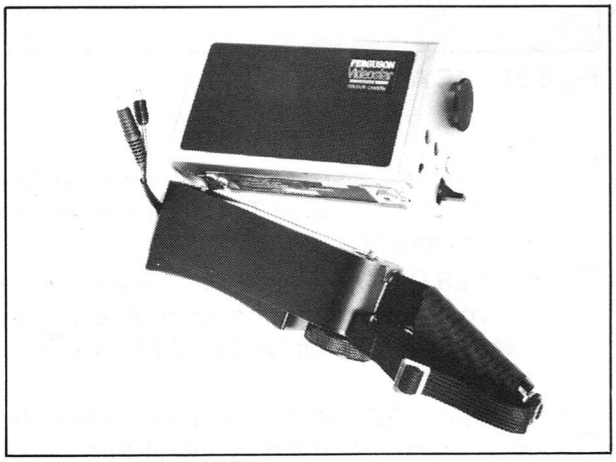


Fig. 3.25 Fitting the Base Unit to the Camera Body

(1) Locate the base unit locking pin into the keyhole shaped slot in the camera body and tighten the large knurled-head securing screw

(2) Fit the appropriate plug into the MIC socket and the other plug into the CHARGE socket on the base unit. DO NOT fit this plug into the DC IN 12V socket of the camera body unless the camera is to be operated from batteries fitted in the base unit

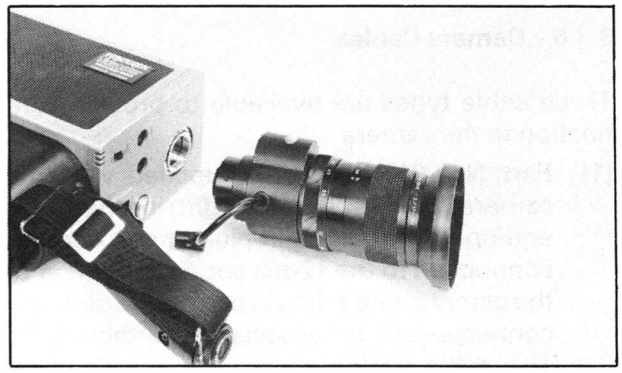


Fig 3.26 Fitting the Zoom Lens to the Camera Body

(3) Unscrew the dust cap from the smaller end of the zoom lens and from the lens mounting bush on the camera body

(4) Carefully fit the zoom lens into the mounting bush and turn clockwise until tight

(5) Remove the protective cover from the pins of the lens miniature connecting plug and insert the plug into the camera body socket marked IRIS

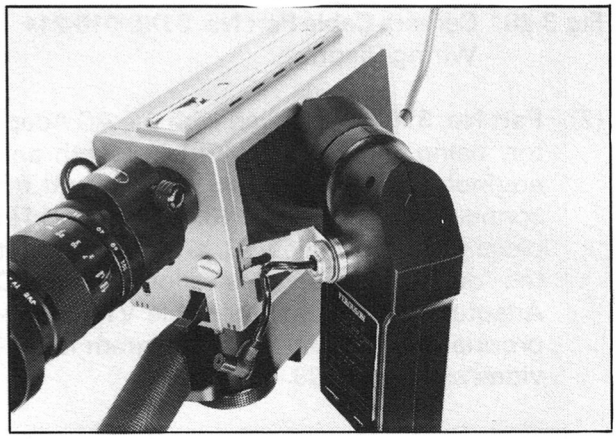


Fig 3.27 Fitting the Electronic Viewfinder to the Camera Body

(6) Loosen the coin-slotted locking screw at the front of the camera body, insert the viewfinder bracket into the slot, and secure the viewfinder in position by turning the locking screw clockwise

(7) Uncap the pins of the viewfinder connecting plug and insert the plug into the camera body socket marked VF

NOTE It is important that when the camera is assembled, other than when being used, the lens cap should be retained in position on the zoom lens in order to protect the vidicon tube from light. If the zoom lens is removed from the camera, immediately fit the dust cap to the lens mounting bush on the camera body. Also fit the zoom lens with the two dust caps provided.

3.1.6 Camera Cables

Three cable types are available to provide connection to the camera

(1) Part No. 01X0-016-214, supplied with the camera, being a cable 3m (10ft) in length and equipped with a 12-pin plug at one end, for connection to the 12-pin socket at the rear of the camera, and a 10-pin plug at the other for connection to an associated portable VTR. The cable wiring diagram is provided by Figure 3.28

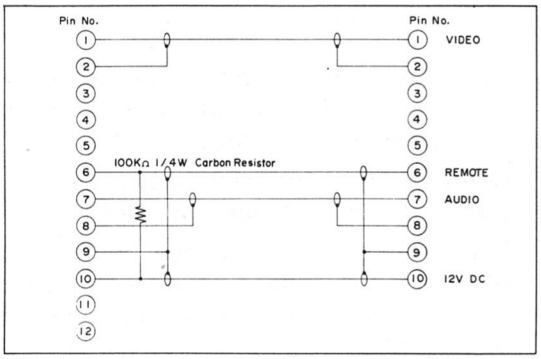


Fig 3.28 Camera Cable Part No. 01X0-016-214 Wiring Diagram

(2) Part No. 3V07B, supplied with the AC Adaptor, being a cable 3m (10ft) in length and equipped with a 10-pin socket at one end, for connection to cable Part No. 01X0-016-214 in place of the portable VTR, and four plugs at the other end for connection to an AC Adaptor and to a non-portable VTR as appropriate. The cable wiring diagram is provided by Figure 3.29

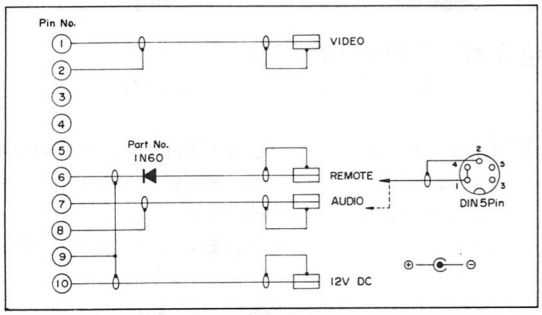


Fig 3.29 Camera Cable Part No. 3V07B Wiring Diagram

(3) Part No. 3V08B, being an extension cable 10m (33ft) in length and equipped with a 12-pin socket at one end, for connection to cable Part No. 01X0-016-214, and a 12-pin plug at the other, for connection to the camera. The cable wiring diagram is provided by Figure 3.30.

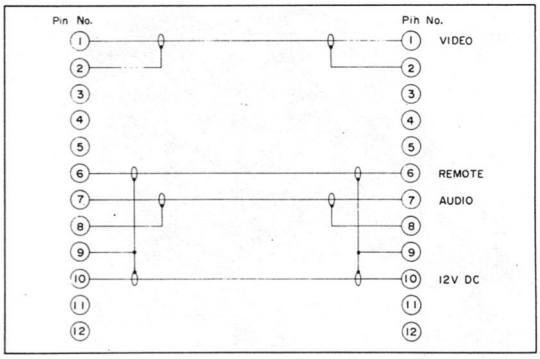


Fig 3.30 Extension Cable Part No. 3V08B Wiring Diagram

3.2 AC ADAPTOR

The AC Adaptor provides the power requirement for the camera to enable it to be used with Videostar models 3V00 and 3292.

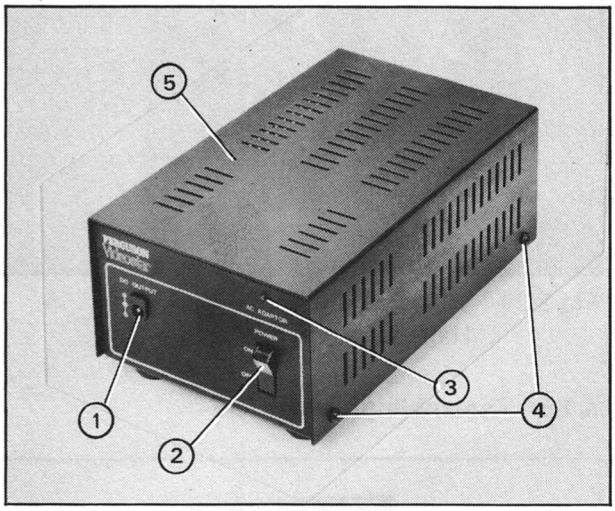


Fig 3.31 AC Adaptor

① DC OUTPUT socket which accepts the 12V DC plug of the cable 3V07B for connection to the camera

② POWER ON/OFF switch which switches the AC mains supply to the adaptor, and consequently the adaptor 13.2V DC output to the camera

③ AC ADAPTOR light, illuminated when the mains supply is switched into the adaptor

④ Adaptor cover retaining screws

⑤ Adaptor cover

⑥ AC mains voltage selector, for selection of 110V or 200V or 220V or 240V, 50Hz input to the adaptor

⑦ Mains input socket providing connection to the mains supply

⑧ Screws securing the mains voltage selector to the adaptor frame

⑨ Screws securing the mains input socket to the adaptor frame

⑩ Cable clip to retain the a.c. mains supply cable when the cable is plugged into the adaptor.

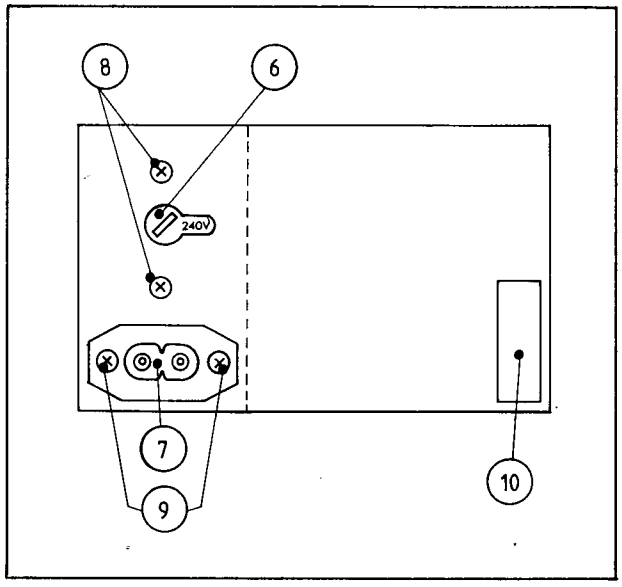


Fig 3.32 AC Adaptor Rear View

3.2.1 Adaptor Cover

The adaptor cover comprises one sheet of metal shaped to cover the top and two sides of the adaptor.

To remove the cover

(1) Remove the two screws ④ as shown in Figure 3.31 and also the two identical screws situated on the oposite side of the cover

(2) Lift the cover clear.

3.2.2 Adaptor Components

To remove the PCB (CA 9007B) support assembly

(1) Remove the two screws ① (Fig 3.33) from the base of the adaptor

(2) Lift the PCB support assembly clear of the adaptor body, taking care as the POWER switch, AC ADAPTOR light and DC OUTPUT socket are withdrawn from the front of the adaptor

The PCB is secured to its support assembly by two screws, situated in diametrically opposite corners of the PCB.

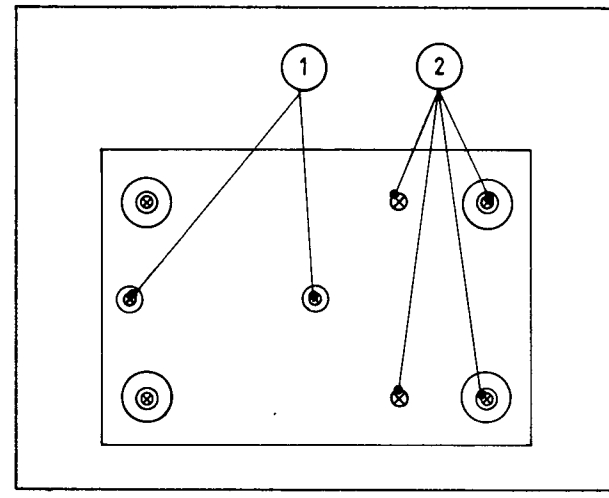


Fig 3.33 AC Adaptor Base View

To remove the transformer

(3) Remove the four screws ② (Fig 3.33)

(4) Lift the transformer clear

To remove the mains voltage selector

(5) Remove the two screws ⑧ (Fig 3.32)

(6) Remove the selector from inside the adaptor body

To remove the mains input socket

(7) Remove the two screws ⑨ (Fig 3.32)

(8) Withdraw the socket through the rear of the adaptor.

3.2.3 AC Adaptor Cables

The AC Adaptor employs two connecting cables

(1) The mains lead, which plugs into the mains input socket ⑦ (Fig 3.32) at the rear of the adaptor

(2) The adaptor connection cable 3V07B, the 12V DC connector of which is plugged into the adaptor DC OUTPUT socket ① (Fig 3.31) at the front of the adaptor. The 10-pin connector end of the cable plugs into the end of the camera connecting cable. The AUDIO, REMOTE and VIDEO plugs connect to appropriate sockets at the rear of the associated VTR. (Model 3292 does not have a REMOTE pause socket, consequently the REMOTE lead is not used.)

4. CONTROLS AND INDICATORS

4.1 CAMERA BODY

Fig 4.1 Camera Body Front View

AGC ON/OFF

In the ON position, switches in the automatic gain control sensitivity circuits. With the automatic zoom lens supplied, this switch should always be in the ON position

VCR

Trigger type start/stop switch with press-to-engage, press-again-to-release action, used to start and stop the associated VTR when the model used has a remote pause feature

POWER ON/OFF

In the ON position, switches power to the electronic circuits in the camera.

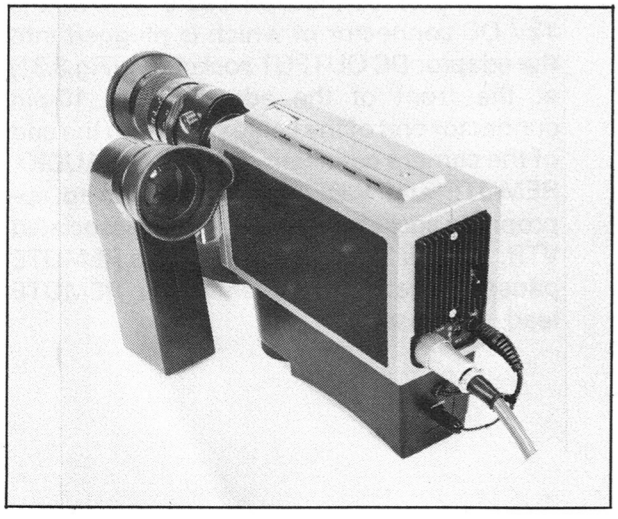


Fig 4.2 Camera Body Rear View

4.2 ZOOM LENS

Focus Control

Control ring, rotated to adjust focus throughout the range of the zoom lens but not used for macro close-ups

Zoom Control

Control ring, rotated between the markings '17' for wide range and '102' for telephoto use, and between '17 and 'M' for precise focus macro (extreme close-up) use

Iris Control (Automatic)

Control knob, pressed in to provide fully automatic iris adjustment, and pulled outwards to provide manual adjustment facilities. The associated scale pointer indicates aperture adjustment between f2 and f22

Iris Control (Manual)

Control ring, engaged when the iris control knob is pulled outwards and rotated manually to provide aperture adjustment between f2 and f22 as indicated on the associated scale pointer.

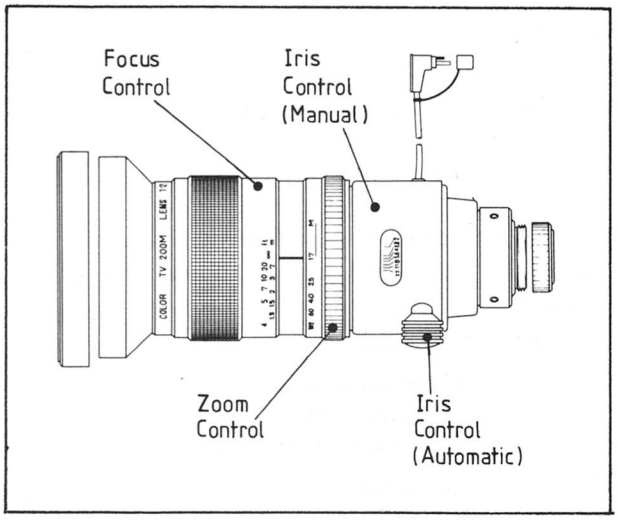


Fig 4.3 Zoom Lens

4.3 ELECTRONIC VIEWFINDER

BRIGHT

Screwdriver adjustment, turned to provide desired lightness or darkness of CRT overall picture

CONTRAST

Screwdriver adjustment.

Fig 4.4 Electronic Viewfinder

Three indicator LEDs are provided above the displayed picture in the viewfinder, used to display various aspects of the operating camera

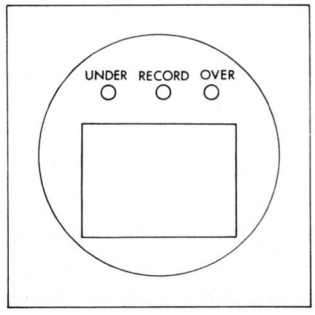


Fig 4.5 Viewfinder Indicators

RECORD

* shows red when power is switched on
* shows green when the VTR trigger start/stop switch is operated to start the VTR
* flashes on and off when the voltage provided by the battery pack is low and the batteries require to be recharged or replaced

OVER

* when the iris is subject to manual adjustment, glows red when the aperture must be reduced

UNDER

* when the iris is subject to manual adjustment, glows red when a larger aperture is required or increased lighting is needed
* when the iris is subject to automatic adjustment, glows red when the lighting level is too low to produce satisfactory results.

4.4 AC ADAPTOR

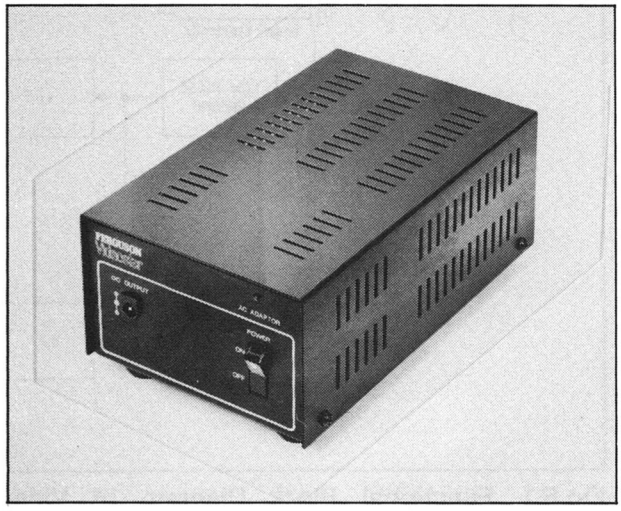


Fig 4.6 AC Adaptor Front View

POWER ON/OFF

In the ON position, converts the AC mains voltage into 12V DC voltage for application to the camera

240V/220V/200V/110V

Mains selection switch, turned as appropriate to the 50Hz mains supply value for the adaptor to convert into a 12V DC output.

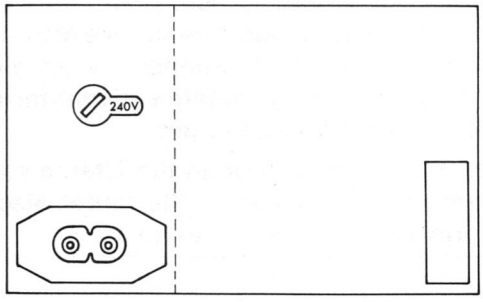


Fig 4.7 AC Adaptor Rear View

5. FUNCTIONAL DESCRIPTION

This single-tube colour video camera uses a virtual step energy decoder system. The principles of operation are shown in Figure 5.1

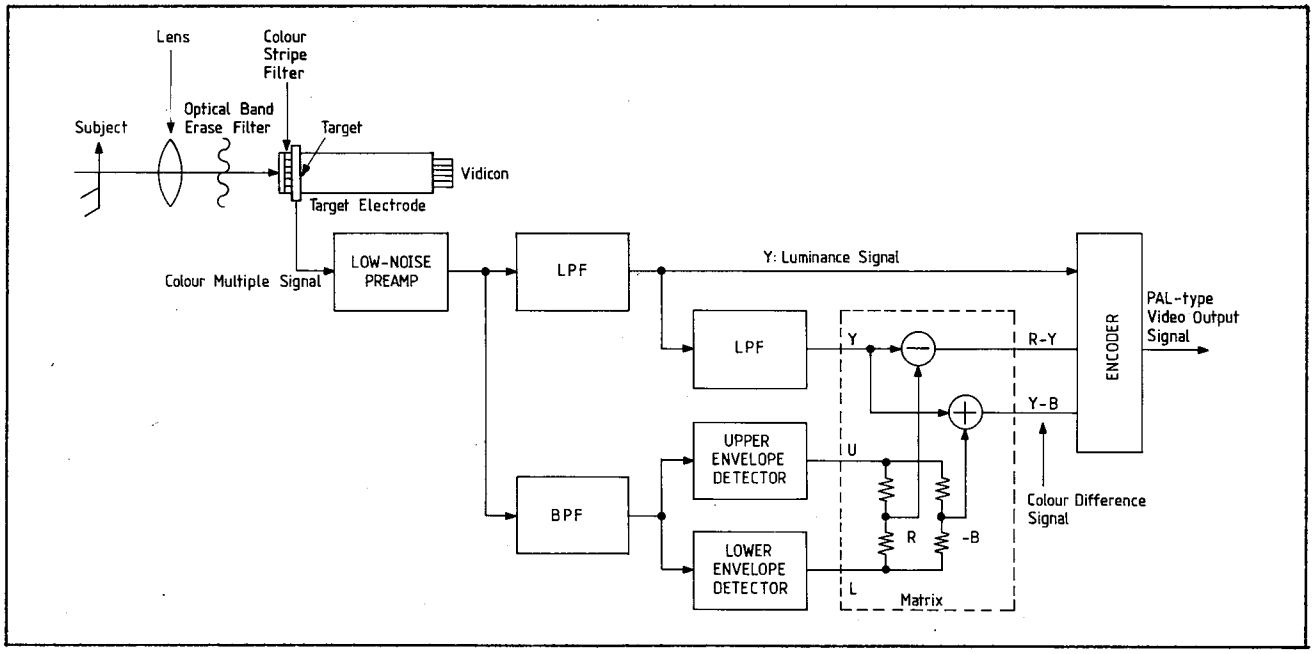


Fig 5.1 Functional Block Diagram of Video Camera Principle

Light reflected from the subject passes through the lens and the optical band erase filter assembly and hits the target of the vidicon tube which has a built in stripe filter. The optical band erase filter assembly is provided to eliminate spurious colour signals that would be generated due to the use of the stripe filter in the vidicon. The optical band erase filter assembly includes a filter to remove infra red radiation. The filtered light passes through the built in colour stripe filter to the target of the vidicon. The colour stripe filter consists of sets of three stripes (green, cyan and white) in front of the photoconductive surface of the target. The target surface is scanned by an electron beam and the colour multiple signal forms the output from the vidicon target.

When light passes through the filter, a step-like waveform is produced at the target electrode. The principle is shown in Figure 5.2

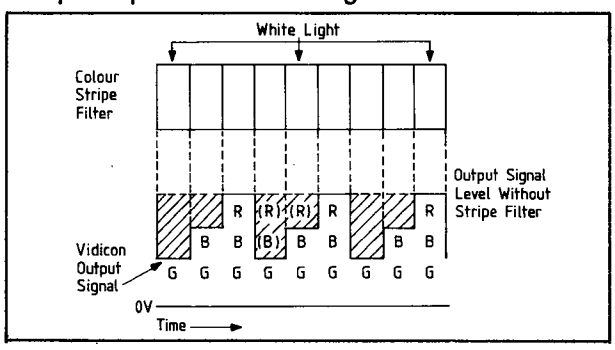


Fig 5.2 Vidicon Output Signal (White Light)

Figure 5.2 shows the waveform produced when white light illuminates the stripe filter. The hatched portions correspond to the energy of red and blue light which is obstructed by the filter (virtual energy). The unhatched portions correspond to the energy of red, blue and green light which passes through the filter.

The colour multiple signal is amplified and taken to both low-pass (LPF) and band-pass (BPF) filters. An average value signal from the LPF filter provides an intensity of luminance signal transmitted as the Y signal. The output of the LPF is also passed through a further LPF and provides a low frequency component for colour demodulation (Y being a mix of colours blue, green and red). The output of the BPF consisting of high frequency colour signals passes through both upper and lower envelope detectors.

The upper envelope detector output signal (U) corresponds to the energy that was lost through the filter and the lower envelope detector output signal (L) corresponds to the energy of light that passes through the filter. The outputs of the envelope detectors are combined in the matrix to produce red (R) and blue (B) signals which are then combined with Y to produce the difference signals (R-Y) and (Y-B). These signals are than applied with the Y signal to the encoder, the output of which is a steady video signal of the PAL-type.

6. TECHNICAL DESCRIPTION

6.1 CAMERA BODY

The camera body contains the vidicon tube and the following six printed circuit boards (PCBs)

(1) PRE AMP (CA 2001A)
(2) VIDEO PROCESS (CA 1501A)
(3) SSG & ENC (CA 3501A)
(4) DEF & POWER (CA 4501A)
(5) POWER AND FOCUS REGULATOR (CA 9501A)
(6) AUXILIARY (CA 5501A)

The major function of each PCB is shown in Figure 6.1, Camera Body PCB Functions.

The technical description of the camera is based on Figure 6.2, Camera 3V06 Block Diagram, Figure 6.3, Camera Body 3V06A Circuit Diagram, and Figure 6.4, Camera 3V06 Connection Diagram.

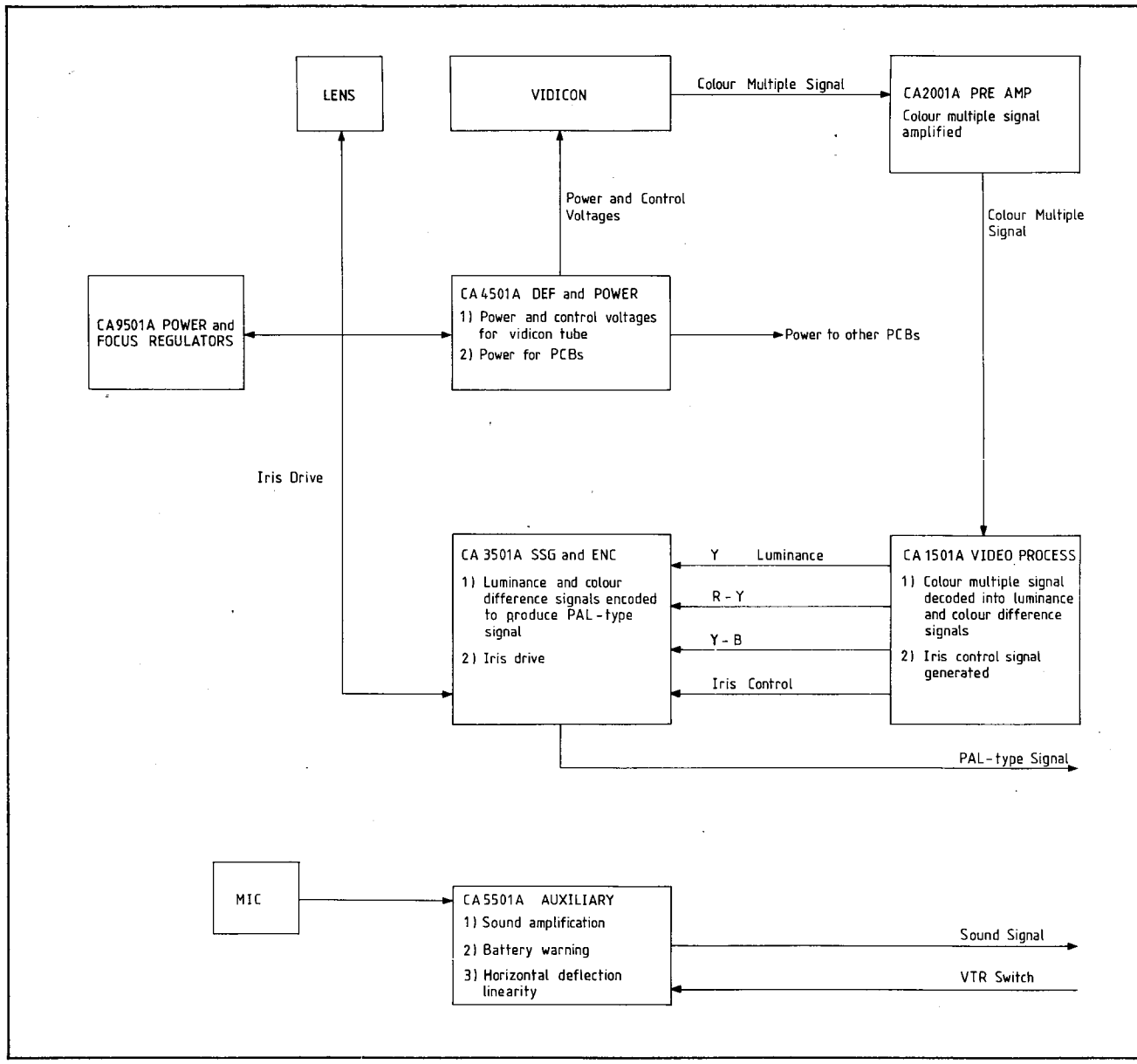


Fig 6.1 Camera Body 3V06A PCB Functions

6.1.1 Vidicon Tube

The vidicon tube is a one inch electromagnetic focus and deflection type with a built in stripe filter consisting of sets of three stripes (green, cyan and white) having the same pitch. The filter is in front of the photoconductive target at right angles to the horizontal electron beam scanning direction. At the bottom of the filter (on the side where the beam starts scanning) is a black mask used for dark current regulation.

6.1.2 PRE AMP

This PCB receives the colour multiple signal from the vidicon target at connection (1) and the target bias voltage from the DEF & POWER PCB at connection (2). The input to the amplifier includes resonant circuit L01 to improve the signal-to-noise ratio at a frequency of 7.2MHz. The amplification of the signal is in two stages with feedback between the output of the first stage at X06 and the input of the first stage FET X02. The second stage of amplification consists of transistors X07 and X08, and the output at connection (6) is taken to the VIDEO PROCESS PCB.

6.1.3 VIDEO PROCESS

The amplified colour multiple signal from the PRE AMP PCB is received at connection [Q1] and amplified by transistor X03. Clamping is applied to the input of this stage via transistor X01 together with shading correction. The output of the amplified signal from X03 emitter (TP-1) is taken to IC11 where white peak compression and AGC is applied. The output of IC11 is taken to transistor X12 buffer, after which luminance signal (Y) and high frequency colour signals take separate paths.

The peak compressor signal is derived from X12 after its carrier components have been suppressed at T11 and T12. The low-frequency signal passes through DC bias temperature compensation diode D13 and is applied to pin (6) of IC11 through VR13 and R27 as the AC signal which controls the amplitude of the colour multiple signal output by IC11.

6.1.3.1 Luminance Signal

The luminance signal, after the elimination of high frequency components at low-pass filter T11, T12 and transistor X13, and peak limiting by X14, again splits into two paths.

One path is via X21 to X26. The signal passes through a delay line and is differentiated by L21, C22, C21, to provide aperture compensation at X23 to improve the resolution impaired by the optical band erase filter. The aperture-compensated luminance signal passes through Y amplifier X24 and is mixed with a blanking pulse, which is applied through D24 connected to its emitter. Then VR21, connected to the emitter of Y-amplifier X25, establishes the setup level and clips the peak value of the mixed blanking pulse (determination of the luminance signal pedestal). D22 and D23 are connected to the collector of X25 to provide γ-correction with their diode non-linearity. The γ-corrected luminance signal is provided with a specified gain by the emitter resistor VR22 of Y-amplifier X26 and then transmitted as the Y output to the SSG & ENC PCB.

The other path is via X31 to X33 which is recombined with the high frequency colour signals after amplification and delay adjusted at T31 (see Section 6.1.3.4).

6.1.3.2 Vidicon Dark Current Correction

To counteract the temperature instability of the dark current of the vidicon, an output is taken from the emitter of amplifier X21 to the collector of X04 which is activated by the black gate pulse (BGP) at the time that the black mask on the vidicon is scanned by the electron beam. The output is taken from the emitter of X04 which is compared with a standard bias in X05 and then controls clamp X01 to maintain the dark current at a constant level.

To counteract any discrepancy between the optical black level (signal received from the vidicon target when scanning the black mask) and the picture black level (the signal received from the vidicon target when scanning a black area on the picture plane) a burning compensation circuit is included. The BGP received at connection [H2] is taken to VR02 which controls the level of inverse bias applied to IC11 at pin (9). IC11 receives the colour multiple signal at pin (10), so that when the vidicon is receiving no light VR02 may be adjusted to equalize the optical and picture black levels. (The level should not change when the black mask is scanned.)

6.1.3.3 Automatic Gain Control

A signal for automatic gain control (AGC) is taken from amplifier X13 and the resulting low-frequency positive signal is applied to AGC amplifier X11, so that its collector produces an average DC voltage smoothed by VR11 and C11. This voltage is applied to IC11 at pin (6) through R17 to control the gain via the AGC switch. VR11 adjusts the AGC operating point. When the AGC switch is OFF, a fixed bias is applied to pin (6) of IC11 through R23, R24 and R17.

To prevent over reduction of signal level, AGC canceller X02 is provided. An inverse bias is applied to the emitter of X02 through R04 and R05 and a negative colour multiple signal from the collector of inversion amplifier X03 is applied to the base of X02. A collector current flows through

X02 only when the colour multiple signal level at X03 collector is less than the voltage on X02 emitter, producing a voltage tending to suppress the AGC operation.

6.1.3.4 Colour Difference Signals

The high frequency colour signals from transistor X12 emitter (TP-2) pass through high-pass filter L41 and C41 and are further filtered, phase compensated in the filter consisting of C43 to C45, L42 and L43 for phase relationship between the basic and second harmonic components. The signal passes through buffer amplifier X41 and enters a comb filter (T41-T44), connected to the emitter of inversion amplifier X42, where bands of frequencies detrimental to colour demodulation are eliminated, and then is amplified in X43. The signal potential is stabilized by DC feedback from X43 to X41. The colour signals (TP-3) split into two paths, one to the upper envelope detector transistor X61 and the other to lower envelope detector transistor X51.

A 1/3(2B+R) signal (corresponding to the blue and red light lost through the stripe filter) is obtained from the upper envelope detector circuit and a 1/3(2R+B) signal (corresponding to red and blue light pulsing through the stripe filter) is obtained from the lower envelope detector circuit. The signal, detected by the upper envelope detector X61, is amplified by transistors X62 to X64, and passes through low-pass filter L81, C85 and C88 to the matrix.

The signal detected by the lower envelope detector X51 is amplified by transistors X52 to X54, and passes through low-pass filter L51, C54, and C55 to the matrix.

The matrix consists of X73 and X74 which combine the outputs of the envelope detectors to produce outputs, representing red (R) and blue (B), components of the received colour signal from the vidicon.

The difference signals are generated in transistors X71, X72 and X75, X76 by combining the R and B signals with the three colour mixed Y signals from the transistor X33.

The three signals are matrixed through resistors R87, R92 and R93 to produce a Y-R signal, which passes through inversion amplifier X71 and is provided with a burst flag pulse. Then it is transmitted through the emitter of buffer amplifier X72 as the R-Y colour difference signal. The emitter of X75 receives a signal which has been matrixed through R94 and R109 and its base receives the B signal. The Y-B colour difference signal from its collector has a burst flag pulse added. The resulting signal is then transmitted through buffer amplifier X76.

The R-Y and Y-B colour difference signals are taken to the SSG & ENC PCB via connections [K4] and [K5].

6.1.3.5 Iris Control Signal

An output consisting of the amplified colour multiple signal is taken from the emitter of X03 via connection [L5] to the SSG & ENC PCB to operate the iris drive.

6.1.4 SSG & ENC

This PCB synthesizes a video signal conforming to the PAL standard from the colour difference signals and luminance signal, coming from the VIDEO PROCESS PCB and the colour subcarrier and sync signals coming from the sync signal generator circuit.

6.1.4.1 PAL-type Signal Encoding

The colour difference signals Y-B and R-Y from the VIDEO PROCESS PCB are received at connections ④ and ⑤ and DC restored at clamps X21 and X22 respectively. The clamped colour difference signals Y-B and R-Y are applied to pins ① of balanced modulator ICs IC21 and IC22 respectively, and modulated onto subcarriers of 4.43MHz from pin ㉗ and pin ㉖ of the sync signal generator IC01 controlled by crystal Y01. The subcarrier outputs pin ㉗ and ㉖ are of different phase and connect to IC21 and IC22 at pins ③ respectively. Resistors R26 and R27 adjust the DC balance of the balanced modulator circuits in order to prevent carrier leakage during non-signal periods. The balanced-modulated chroma signals are emitted from pins ⑦ of IC21 and IC22 and are mixed at R31-R33 to produce a chroma signal of the PAL-type. Chroma balance resistor R32 adjusts for variation in the IC gains.

The chroma signal is applied, through C27, to the chroma limiting circuit via the emitter of X23 and to the chroma amplifier X25 via the primary winding of band pass transformer T31. The chroma limit signal from the VIDEO PROCESS PCB received at connection ② is applied to the base of X24 as an input of positive polarity. The collector of X24 is connected to the base of X23, lowering the base voltage as the low-frequency chroma limit signal (luminance signal component) increases. Resistance between the emitter and collector of X23 decreases as the low-frequency signal level increases. Since this resistance is in parallel with the primary winding of T31, the chroma signal is also compressed. R35 determines the voltage at which this compression begins. It determines the emitter voltage of X24 in such a way that X24 is cut off for low frequencies below a specified level, preventing current from flowing through the base of X23.

A chroma blanking pulse is applied to the base of X23 through C12, from IC01, thereby turning X23 on during the periods other than the effective picture period and the burst period. As a result, the chroma and noise components are eliminated during these periods.

The luminance signal (Y) is received from the VIDEO PROCESS PCB at connection ③ and applied to the emitter off X25. The composite sync signal is applied to the collector of X25 via R44. The chroma signal enters band-pass transformer T31 (where its harmonics of 4.43MHz are eliminated) and then is applied to the base of X25 which mixes the luminance signal and sync signal with the chroma signal. The resulting signal passes through buffer amplifier X26 and then is output from connection ⑰ to the VTR connector via R48 as the PAL-type colour composite signal having an output impedance of 75 ohms.

During playback, the VTR signal is applied to pin ① of the camera connector, its DC voltage cuts off X26 rendering the camera video output signal unavailable, but the VTR playback signal is supplied to the electronic viewfinder through the viewfinder connector [J3], enabling playback monitoring (black/white pictures).

6.1.4.2 Subcarrier and Sync Generator

IC01 and associated components (SSG) generates subcarriers and sync signal pulses required for the camera. The SSG circuit contains two reference oscillators, one for producing a master clock pulse and the other a sub-master pulse.

The former contains crystal Y01 and the latter inductor T01. The crystal oscillator frequency is divided in IC01 to provide the subcarrier frequencies at pin ㉖ and pin ㉗. The output at pin ㉗ is delayed by 90° with respect to pin ㉖.

The latter inductance/capacitance oscillator frequency is divided and stabilized in IC01. The various pulses required for camera operation are produced from the stabilized sub-master clock pulse through frequency dividers and pulse formers.

6.1.4.3 Iris Drive

Comparator IC51 receives the iris control signal from the VIDEO PROCESS PCB via connection [L5], and the two halves of the comparator, drive transistors X51 and X54, to operate the iris via connections [R1] and [R2]. The position of the iris is indicated via [R3] and [R4] and fed back to the comparator.

Signals on connections [R3] and [R4] are taken via [W2] and [W3] to the viewfinder to indicate over/under exposure by illuminating LEDs.

6.1.5 DEF & POWER

The DEF & POWER PCB provides the vertical and horizontal deflection for scanning the vidicon electron beam, the high voltage and focus control for the vidicon tube, and the regulated voltage for the other PCBs.

6.1.5.1 Vertical Deflection

In the vertical deflection (VD) circuit, the C.VD pulse from the SSG & ENC PCB received at connection [G4] is formed into a saw-tooth wave voltage at X31. When a C.VD positive pulse is applied to the base of X31, it switches on to allow C31 to discharge. The negative portion of C.VD allows a charging current to flow through R44, R32, C31 and R34 to gradually increase the voltage at both ends of C31. A saw-tooth waveform voltage is generated with the repeated on-off operation of X31 by C.VD. The saw-tooth waveform voltage is amplified by operational amplifier IC71 and applied to the deflection coil via vertical output transistors X32 and X33. Bootstrap capacitor C32, together with C33, compensates for vertical linearity. The circuit operation is stabilized by negative feed-back of the parabolic voltage to pin ⑥ of operation amplifier IC71. Zener diode C32 is used to protect the output transistors when C.VD is not applied. The vertical width and the charging time constant are adjusted by variable resistor R32. For compensating for the dark current (the vertical centering), the junction voltage between X32 and X33 and the voltage obtained by dividing the power supply voltage by R41 through R43 are balanced and the vertical centering is applied to the vertical deflection coil.

6.1.5.2 Horizontal Deflection

In the horizontal deflection circuit (HD) the C.HD pulse from the SSG & ENC PCB received at connection [G3], drives horizontal output transistor X02 via X01. X01 protects X02 by decreasing the base current in the absence of the C.HD pulse. The horizontal deflection circuit enhances scanning stability in terms of centering, deflection width and deflection linearity. Variations of the horizontal deflection directly affect the carrier frequency leading to variations of colour shading. Horizontal linearity is achieved by using a horizontal centering circuit of bridge construction and a linearity coil L42 (on the AUXILIARY PCB) having a saturable reactance. L41 (on the AUXILIARY PCB) is the horizontal width control coil which changes the deflection current by changing its inductance. Resistor R04 in series with the deflection coil is used to change the linearity. Sub-linearity variable resistance R42 is used to compensate the high frequency component, so

the linearity at the horizontal scanning is improved. Linearity compensation for temperature changes is achieved by L01 and X41, R44 and R43 that are contained on the AUXILIARY PCB. The horizontal output transistor X02 drives horizontal output fly-back transformer T01. The horizontal deflection coil connected at F5 and F7 is driven through T01 and via the width control circuit on the AUXILIARY PCB.

6.1.5.3 High Voltage Generation

High voltages are generated in T01 and rectified in the associated diodes to supply the vidicon electrode voltages. The thermistor connected to A1 and A3 compensates for temperature variation by lowering the target voltage when the temperature rises. The high voltage circuit also supplies 24 volts to the PRE AMP PCB.

6.1.5.4 Focusing Circuit

The dynamic focusing circuit consists of X51 and X52 and is used to mix and supply the horizontal and vertical parabola voltages to electrode G3 so as to optimize the peripheral focusing of the vidicon.

The beam focus depends on the relationship between the focusing magnetic field and the focusing electrode voltage (G3 voltage) produced by the focusing current. Fluctuations in the focusing voltage due to the EHT fluctuation are detected by CR01 from the high voltage rectifiers HM01, and applied to the resistor module RM71 through amplifier IC71. In addition, a reference voltage is applied from X72 to the resistor module. The focusing current is controlled by these two voltages.

X71 is the drive transistor and X02 (on the POWER & FOCUS REGULATOR PCB) is the output transistor. R72 through R74 are resistors to detect the focusing current. The voltage across the resistor is applied as negative feedback to the operational amplifier so that the focusing current is always constant. In addition, taking temperature characteristics into consideration, high accuracy metal film resistors are used for R72 through R74. The focusing current value is controlled by adjusting the reference voltage using R75.

6.1.5.5 PCB Power Supply

The regulated 9 volt supply to power the PCBs is derived from the 12 volt camera battery, the VTR or AC Adaptor supply, and consists of transistor X72, operational amplifier IC71, and transistor X01 on the POWER & FOCUS REGULATOR PCB. A reference voltage generated by X72 and zener diode D71 is applied to the operational amplifier IC71, the output of which drives X01. The resultant output is fed back to the IC71 input which stabilizes the voltage determined by the position of the R81 control.

6.1.6 POWER & FOCUS REGULATOR

This PCB is associated with the DEF & POWER PCB and contains the power transistor for the 9 volt supply to the PCBs and the power transistor for the supply to the focus coil of the vidicon.

6.1.7 AUXILIARY

6.1.7.1 Sound Amplification

The output from the microphone is received at connection 01 and amplified in IC01, the output of which connects to T2.

6.1.7.2 Battery Warning Circuit

The battery warning circuit consists of X31, X32 and X33 transistors.

Transistors X31 and X32 form an astable multivibrator circuit and the voltage is applied to the base of X32 through switching transistor X33 and R34.

Transistor X33 switches on when the power voltage (12V line) is less than normal voltage and is off when the voltage is normal. Therefore, the astable multivibrator does not oscillate. When the power voltage (12V line) becomes lower than 10.7V, X33 turns on with its bias current determined by R35 and R36, allowing collector current to flow to apply bias to the base of X32 through R34, thus X32 and X31 oscillate. This oscillating output makes the LED lamp in the viewfinder flicker every 4-5 seconds with new batteries. It becomes 0.5 seconds when the voltage falls below the usable range.

6.1.7.3 Horizontal Deflection Compensation

The components associated with X41 relate to the functions carried out on the DEF & POWER PCB and provide horizontal deflection compensation.

6.2 ELECTRONIC VIEWFINDER

Ref drawings

Fig 6.2 Camera 3V06 Block Diagram

Fig 6.5 Electronic Viewfinder 3V06D Circuit Diagram

Fig 6.4 Camera 3V06 Connection Diagram

The electronic viewfinder is self contained in that all the voltages and signals necessary for controlling the CRT are generated within the unit from the input of 12 volts and the PAL-type video signal from the camera body.

6.2.1 CRT

The viewfinder uses a 1.5 inch CRT with a directly heated cathode.

6.2.2 VIDEO & H.DEF

This PCB provides the processing of the PAL-type signal and the horizontal deflection voltage for the CRT.

6.2.3 VERT & POWER

This PCB provides the vertical deflection and high voltages for the CRT.

6.2.4 LED ASSY

The LED assembly is not connected to the rest of the electronic viewfinder except through the plug that connects to the camera body. The LEDs are illuminated by signals derived on the camera body PCBs. The exposure over/under LEDs only function correctly when the lens is set for manual iris control.

6.3 GRIP

The grip contains the microphone, batteries and a fuse but no PCBs. If rechargeable cells are used, the socket that normally is used for stowing the flying lead from the camera may be used to connect a suitable voltage source to recharge the cells.

6.4 AC ADAPTOR

Ref drawings

Fig 6.2 Camera 3V06 Block Diagram

Fig 6.6 AC Adaptor 3V07A Circuit Diagram

The AC Adaptor contains one PCB and a mains transformer. A mains warning light is provided which consists of a LED that monitors the output of the low voltage rectifier before the voltage is stabilized. The circuit includes short-circuit protection as well as voltage stabilization.

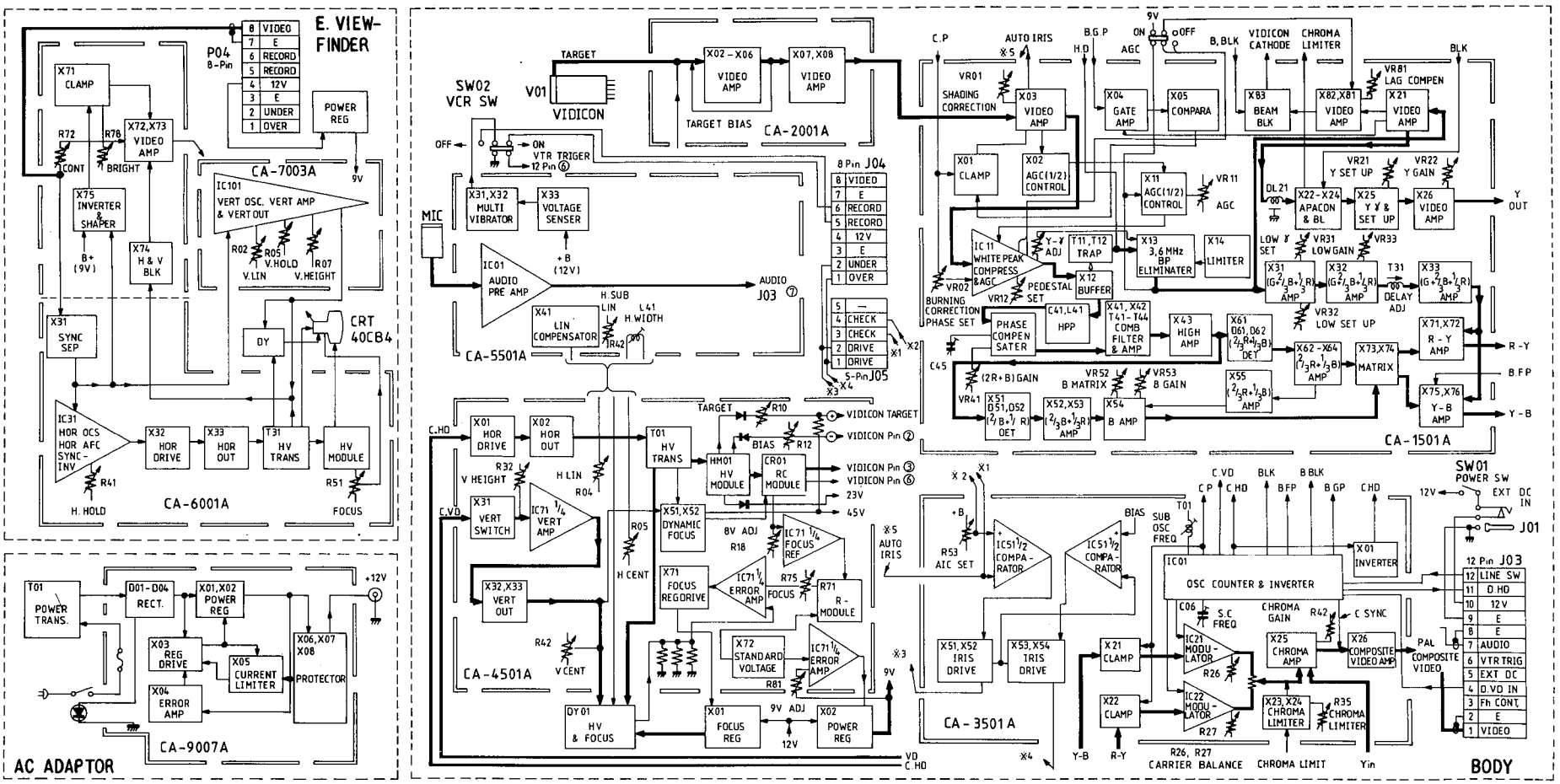


Fig 6.2 Camera 3V06 Block Diagram

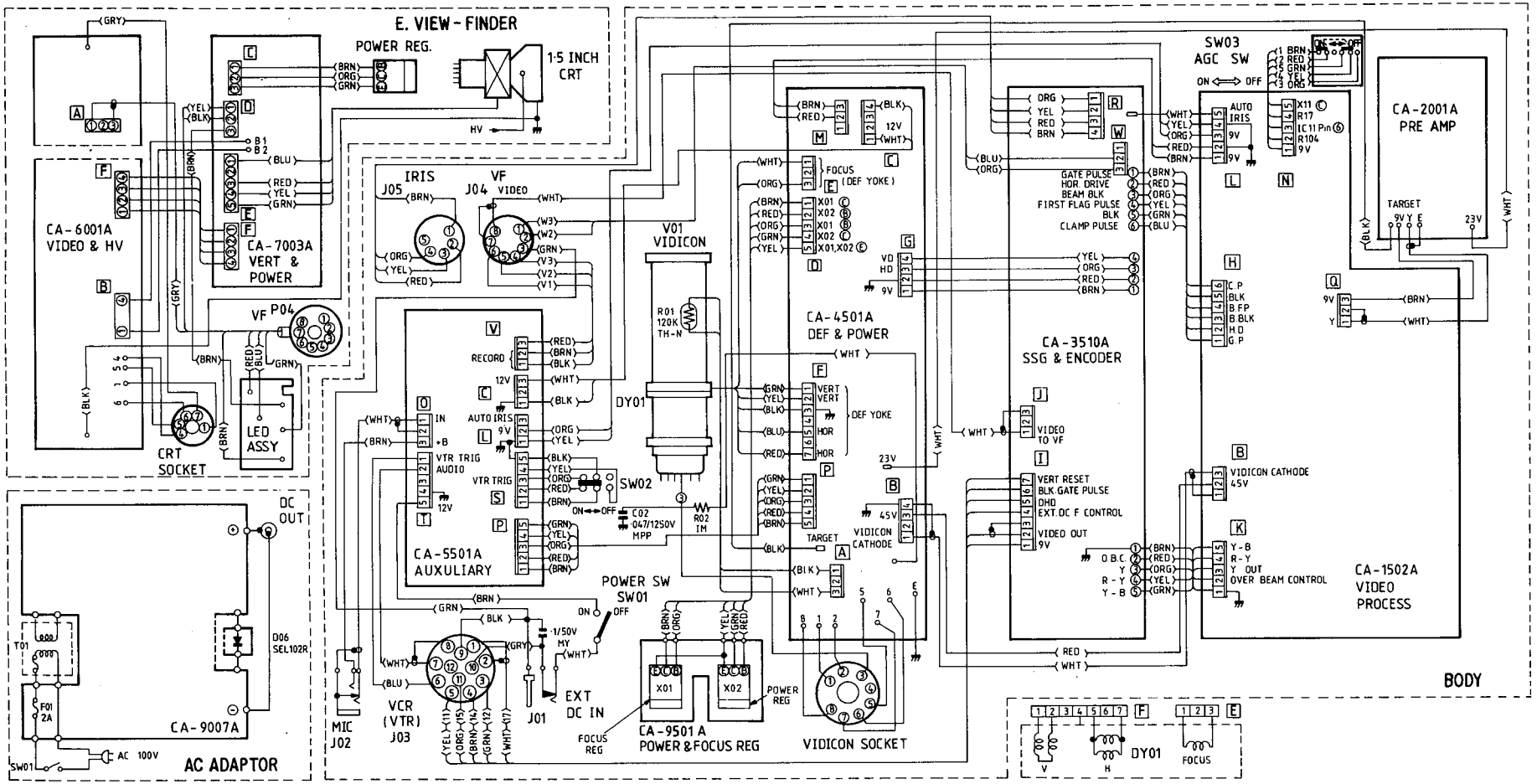


Fig 6.4 Camera 3V06 Connection Diagram

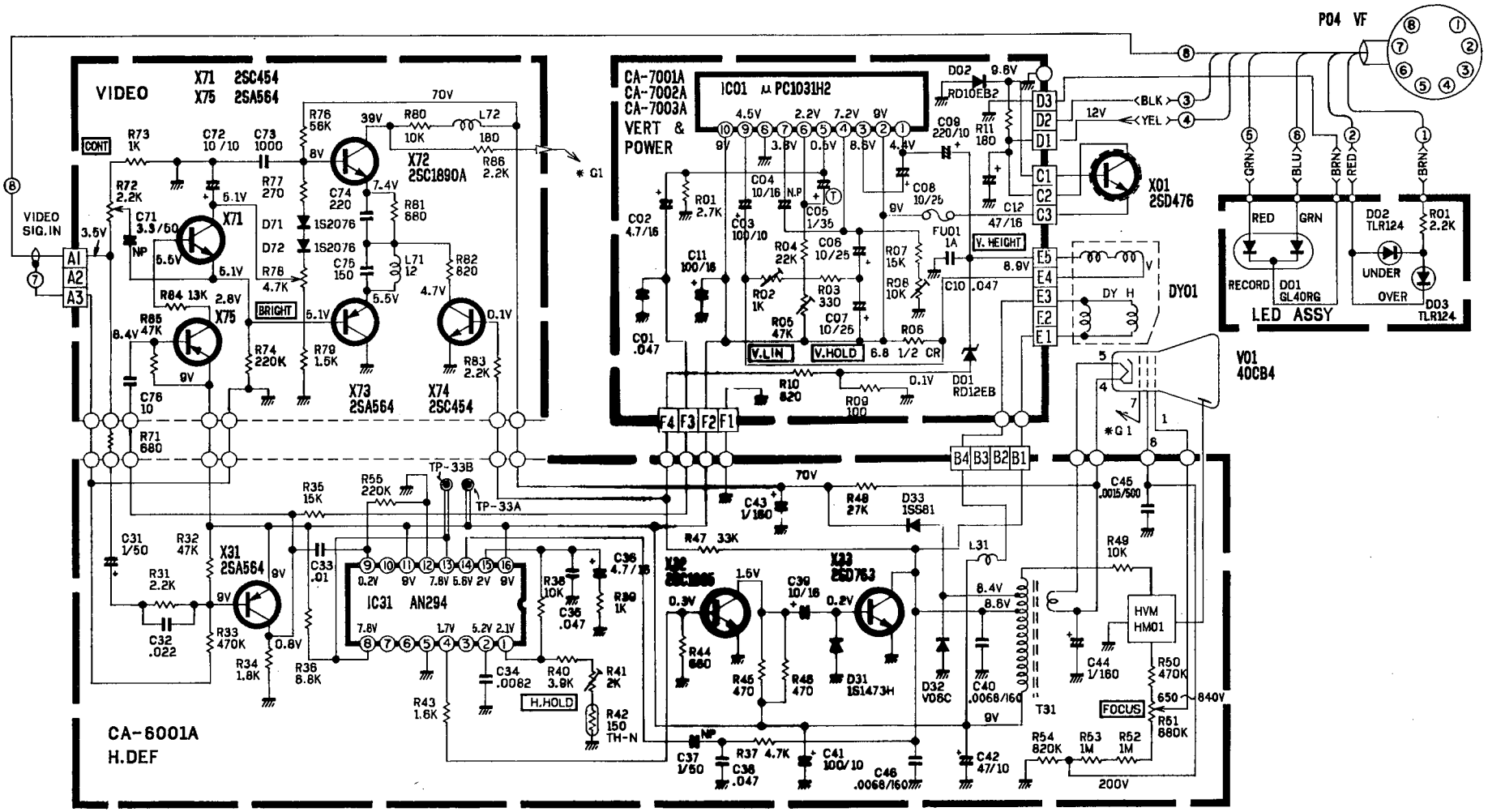


Fig 6.5 Electronic Viewfinder 3V06D Circuit Diagram

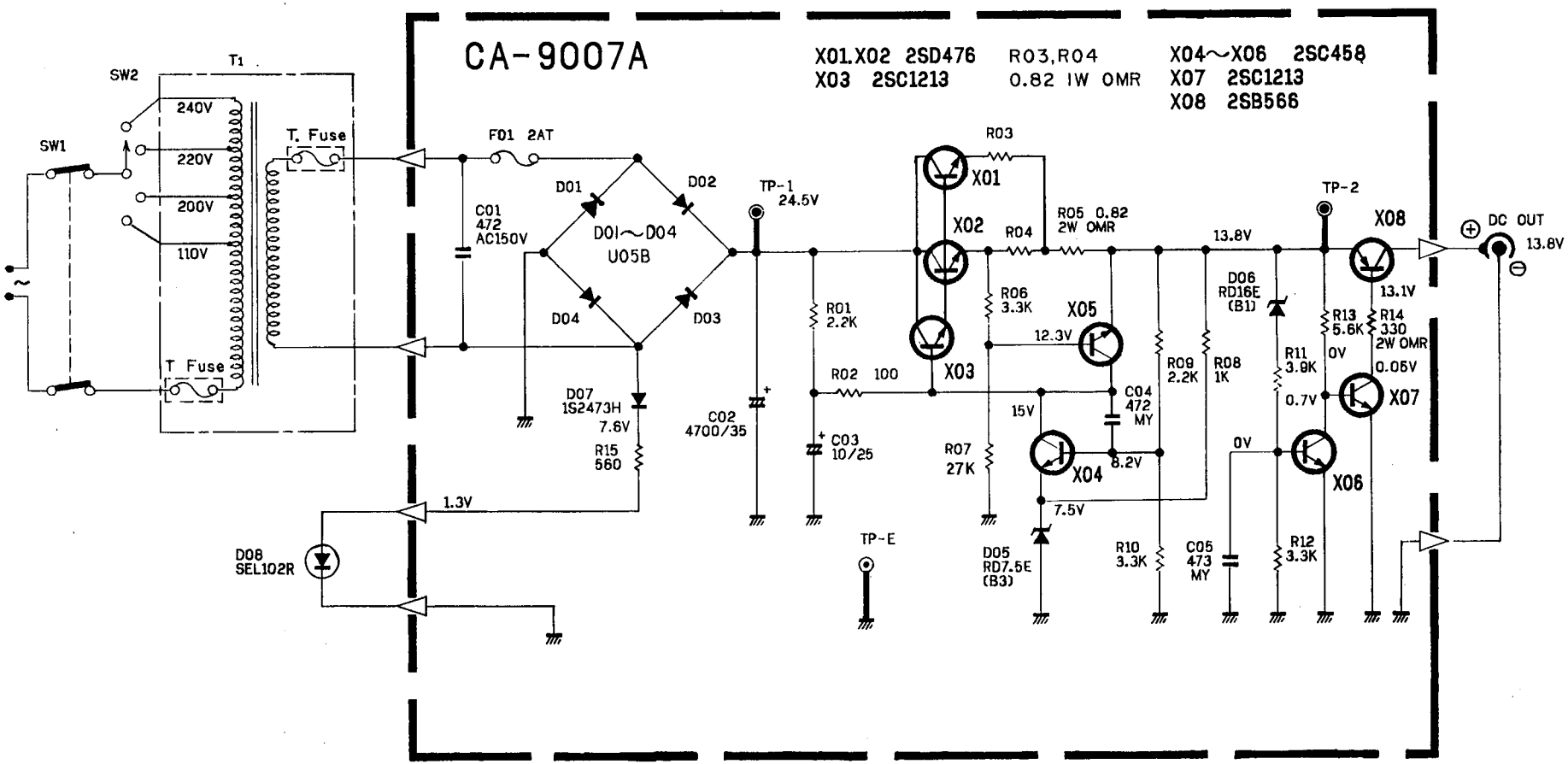


Fig 6.6 AC Adaptor 3V07A Circuit Diagram

7. SETTING UP PROCEDURES

7.1 EQUIPMENT INTERCONNECTIONS

7.1.1 System Employing Portable VTR

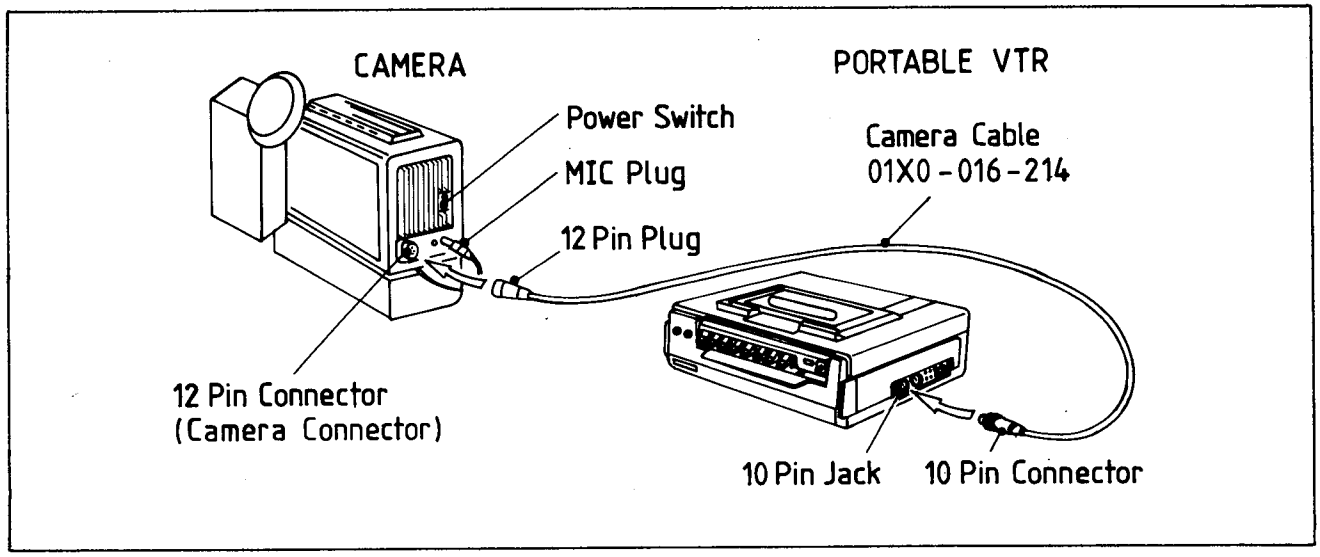


Fig 7.1 Connection of Portable VTR to Camera

7.1.2 System Employing Non-portable VTR

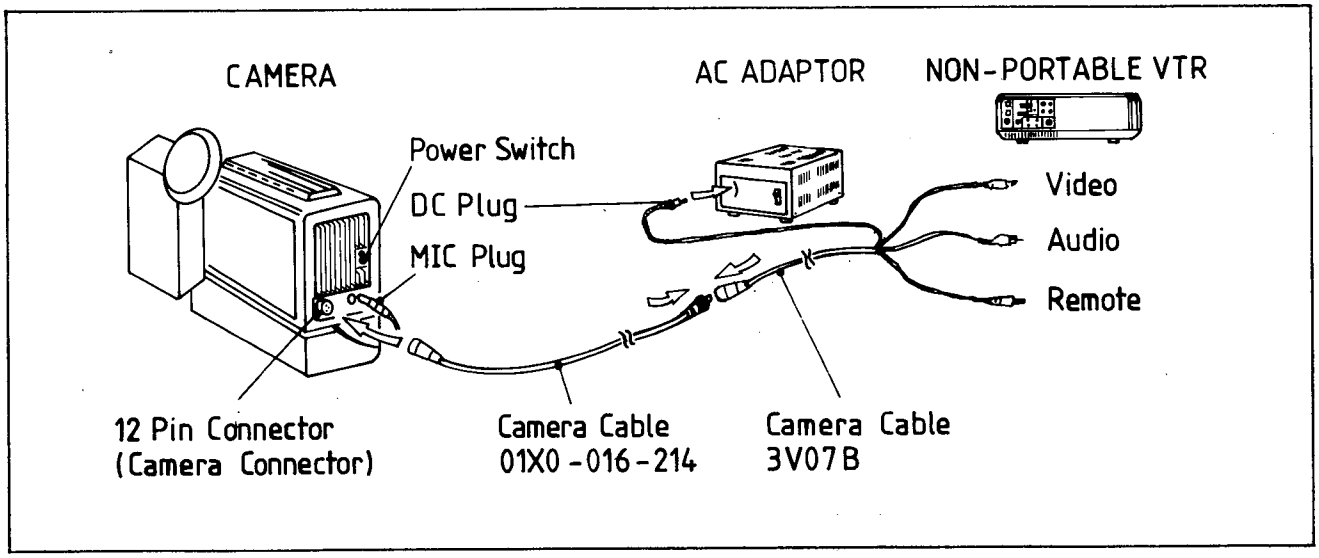


Fig 7.2 Connection of Non-portable VTR to Camera

7.2 ALIGNMENT OF CAMERA BODY

The following alignment procedure should be carried out whenever the vidicon or the deflection yoke is replaced.

7.2.1 Test Equipment

To carry out the alignment procedure, the following items of test equipment are required

* Oscilloscope
10mV/div, frequency range 0 to 15MHz (DC), one off probes 10:1 and 1:1
* Colour TV Monitor Underscanning type
* Lighting
500W halogen lamp (frosted type) providing colour temperature of 3200K or equivalent

* Test Pattern Class 3
  * Grey-scale pattern with $\gamma = 2.2$ (with 3:4 aspect ratio) and 11 steps (see Fig 7.3)
  * White pattern (providing white colour without halation, i.e. drawing paper)
  * Red and blue pattern (left half red and right half blue, i.e. colour-coated drawing paper)
* Frequency Counter

Frequency range 10MHz maximum (approx)

* Zoom Lens CV-L617AMS
* Colour Filter

Red (Kodak Wratten gelatin filter No. 25) (This filter to be inserted between clear flat glass plates to facilitate mounting over the lens. Lens hood also applicable.)

* Power Supply AC Adaptor
* DC Voltmeter

VTVM or digital voltmeter (accuracy within ±1%)

* Jumper As shown in Figure 7.4, one off each
* Adjusting Bar One off each

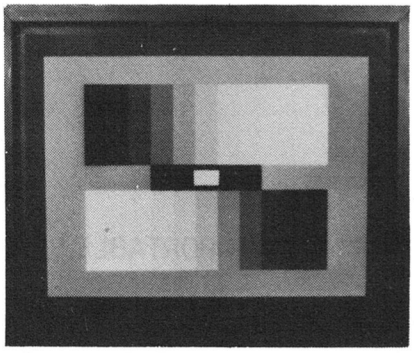


Fig 7.3 Grey-scale Pattern

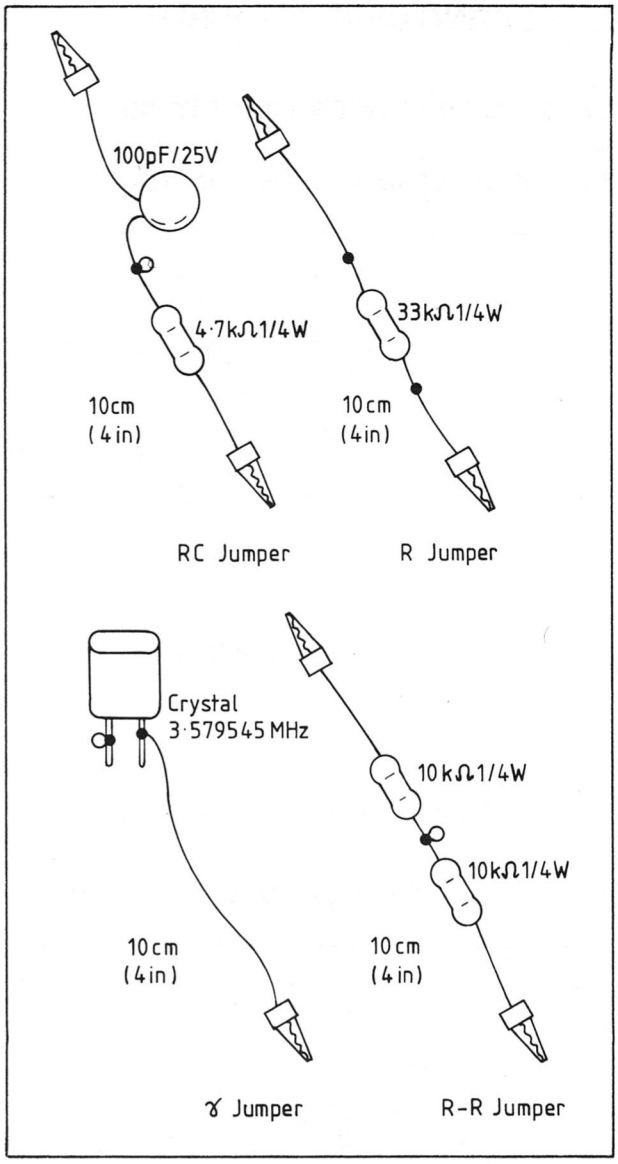


Fig 7.4 Jumpers Required for Alignment

7.2.2 Instrument Connections and Set Up

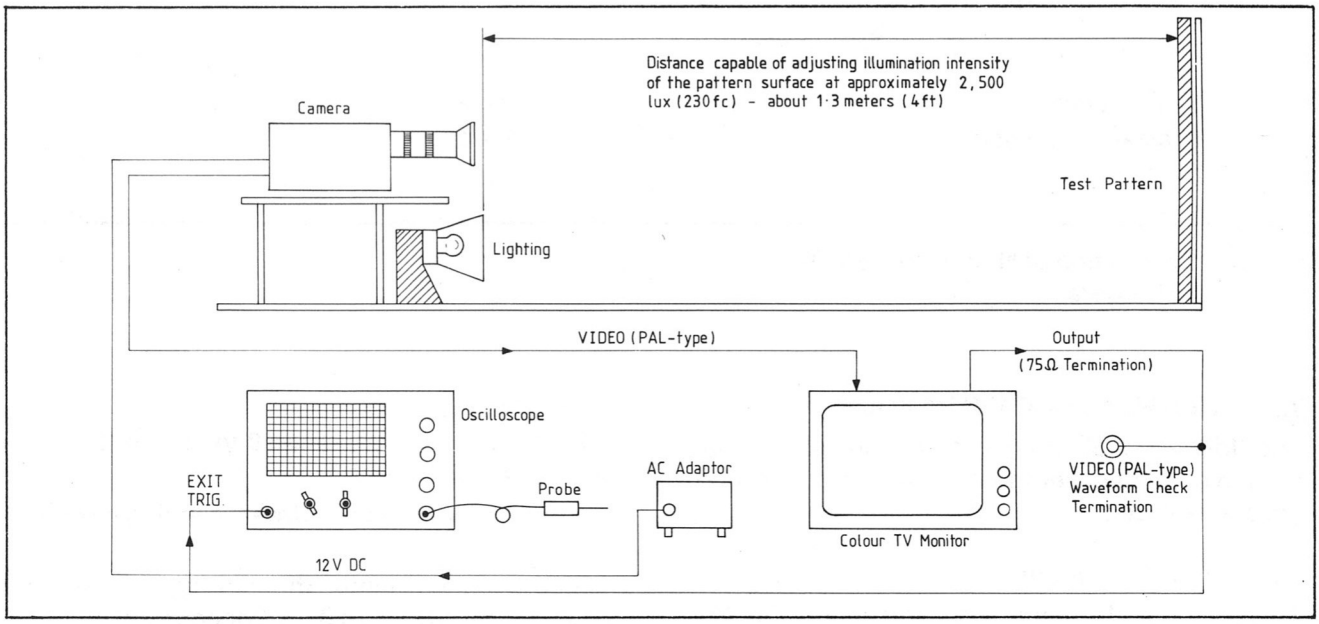


Fig 7.5 Instrument Connections and Set Up

7.2.2.1 Lighting

Use an illumination lamp providing 3200K colour temperature. Adjust illumination intensity of the pattern surface at approximately 2500 lux (230 fc). Simultaneously adjust the distance between the camera lens and the pattern to maintain uniform illumination.

NOTE Correct illumination is necessary for accurate camera alignment.

7.2.2.2 Application of Oscilloscope EXIT TRIG Terminal

Apply video signals to the VIDEO OUT terminal on the colour TV monitor. When video signals are difficult to synchronize, video signals may be separately taken out from the following components

(1) When vertical synchronization is required, connector [F1] on the Def and Power PCB (CA 4501A), shown in Figure 7.6

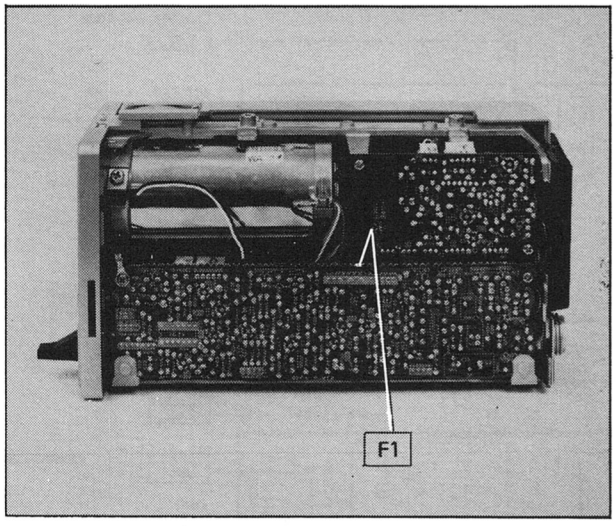


Fig 7.6 Connector [F1] (CA 4501A)

(2) When horizontal synchronization is required, connector [H2] on the Video Process PCB (CA 1501A), shown in Figure 7.7.

7.2.2.3 PAL-type VIDEO Signals

Use the VIDEO OUT terminal on the TV monitor connected with a 75Ω resistor to check the waveform of the PAL-type VIDEO signals.

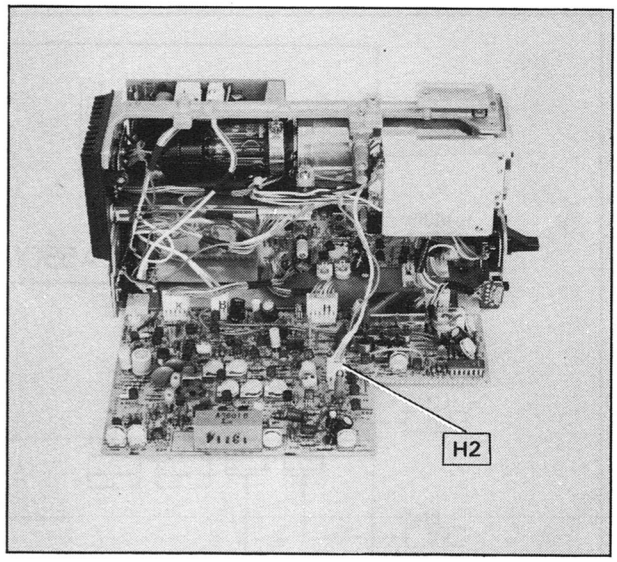


Fig 7.7 Connector [H2] (CA 1501A)

7.2.3 Camera Preparation

(1) Remove the covers from the camera body and remove the retaining screws from the Video Process PCB (CA 1501A), SSG and Encoder PCB (CA 3501A), Def and Power PCB (CA 4501A) and Auxilliary PCB (CA 5501A)

(2) Earth the ring grounding wire terminal normally earthed to the camera body by the retaining screw of CA4501A

(3) Set POWER switch to ON and allow the elapse of a camera warm-up period of 10 to 15 minutes

(4) When the vidicon has image retention (an afterimage still appears even though the iris control mechanism is closed), set POWER switch to the OFF position for approximately 20 seconds, then return switch to the ON position in order to proceed with the alignment procedures.

7.2.4 Power Supply Adjustment

(1) Connect a DC voltmeter between connector [D4] on the Def and Power PCB (CA 4501A) and earth

(2) Adjust R81 [9 V ADJ] on CA 4501A until the voltmeter indicates 9V ±0.1V.

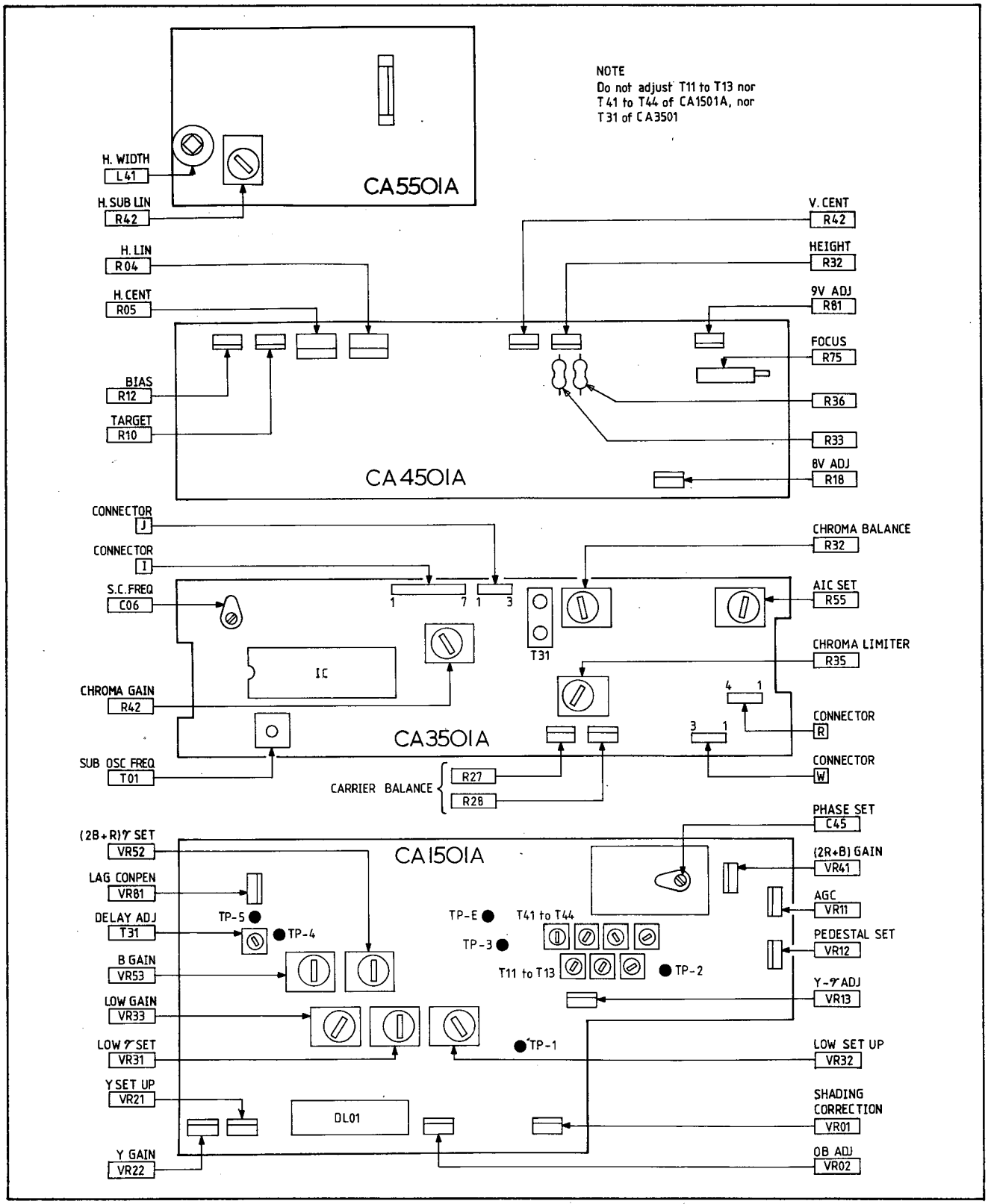


Fig 7.8 Location of Adjustment Facilities

7.2.5 SSG and Modulation Axis Adjustment

SSG and modulation axis adjustment is required only after carrying out repairs that result in the need for additional adjustment.

7.2.5.1 SSG Oscillation Frequency (4.43MHz Subcarrier)

There are two methods of adjusting the SSG oscillation frequency

* Method 1 using the frequency counter
* Method 2 using the VIDEO output signal of the TV monitor.

Method 1

(1) Set POWER switch to the OFF position and remove the shield case from the components side of the SSG and Encoder PCB (CA 3501A)

(2) Set POWER switch to the ON position and connect the frequency counter probe between point [12] (IC 01 27 PIN line of CA 3501A) as shown in Figure 7.9 and earth

(3) Adjust C06 [SC FREQ] on CA 3501A until frequency counter reads 4.43362MHz ±10Hz.

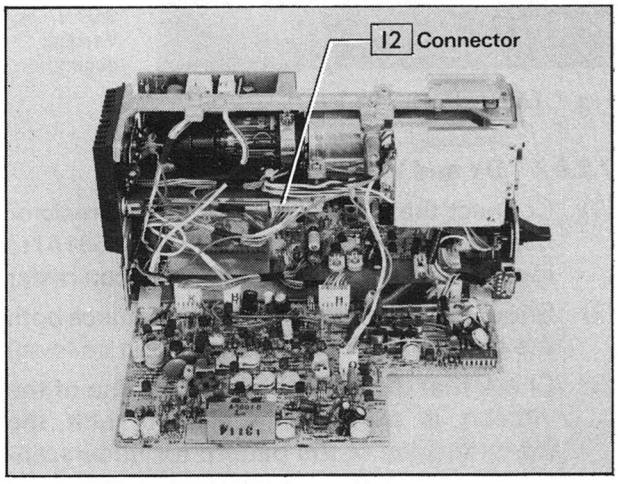
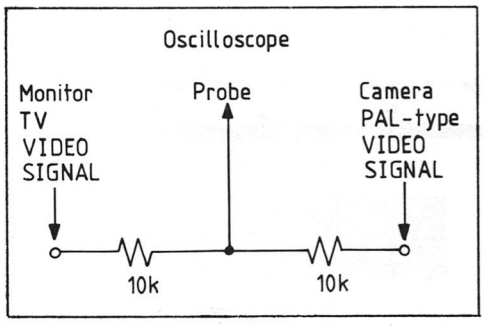


Fig 7.9 Location of [12] (CA 3501A)

Method 2

(1) Apply the VIDEO output of the TV monitor and PAL-type VIDEO output of the camera through two resistors to the oscilloscope as shown in Figure 7.10

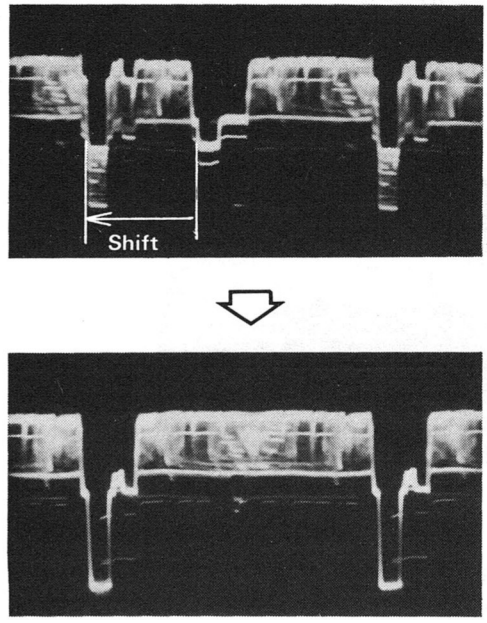


Probe 10:1
0.05 V/Div
Horizontal
oscillation

Fig 7.10

(2) In this instance, the TV monitor receives the colour broadcasting channel and the camera reproduces the white pattern

(3) Adjust C06 [SC FREQ] on CA 3501A until a stable zero beat is attained at the signal portion shown in Figure 7.11.



Probe 10:1
0.05 V/Div
Horizontal
oscillation

Fig 7.11

7.2.5.2 Sub-oscillation Frequency

(1) Connect the DC voltmeter between connector [12] on the SSG and Encoder PCB (CA 3501A) and earth

(2) Adjust T01 [SUB OSC FREQ] on CA 3501A until voltmeter reads 3.5V ±0.1V.

7.2.5.3 Chroma Balance

The chroma balance adjusting procedure is conducted while observing the results on the TV monitor. Before proceeding, adjust the colour phase of the TV monitor.

(1) Shoot a subject of appropriate colour for adjusting the colour phase at the colour temperature of 3200K and illumination intensity of approximately 2000 lux (190 fc)

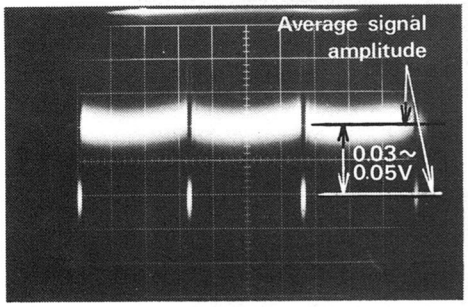
(2) Adjust R32 [CHROMA BALANCE] volume on CA 3501A to adjust colour phase to the optimum condition.

7.2.6 Deflection System Adjustment

7.2.6.1 Vidicon Dark Current Coarse Adjustment

(1) Cover the lens with the cap or close the iris control mechanism. Then, connect the probe provided with the oscilloscope to terminal TP-1 on the Video Process PCB (CA 1501A)

(2) Adjust R10 [TARGET] volume on the Def and Power PCB (CA 4501A) until the voltage reading is between 0.03V and 0.05V, as shown in Figure 7.12.



Probe 1:1
0.02 V/Div
Vertical
oscillation

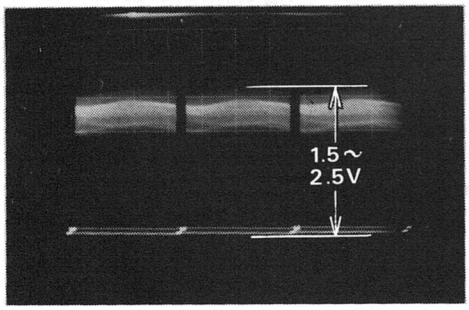
Fig 7.12

7.2.6.2 Preset Vidicon Beam Current Coarse Adjustment (three times beam current)

(1) Connect the oscilloscope probe to terminal TP-1 on the Video Process PCB (CA 1501A)

(2) Shoot the white pattern while releasing the iris control mechanism (at an illumination intensity of over 2500 lux)

(3) Adjust R12 [BIAS] volume on the Def and Power PCB (CA 4501A) until the voltage is between 1.5V and 2.5V, as shown in Figure 7.13. In this instance, confirm that the amplitude of the waveform does not vary (without return) even though the iris control mechanism on the lens is slightly closed from the released point.



Probe 1:1
0.5 V/Div
Vertical
oscillation

Fig 7.13

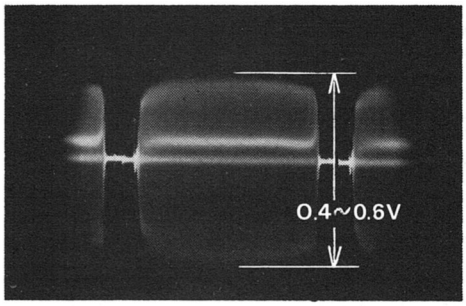
7.2.6.3 Focus Coarse Adjustment

(1) Connect the oscilloscope probe between terminals TP-3 and TP-E on the Video Process PCB (CA 1501A)

(2) Shoot the white pattern and adjust the iris control mechanism to attain a voltage between 0.3V and 0.5V (see Fig 7.14)

(3) Connect the DC voltmeter to the terminal TP near the IC 71 (8) PIN on the Def and Power PCB (CA 4501A) and adjust the reference focus voltage potentiometer R18 [8V ADJ] until the voltmeter indicates 8V

(4) Adjust R75 [FOCUS] on CA 4501A until the amplitude of the waveform is increased to the maximum level and uniform white balance is achieved on the TV monitor, as shown in Figure 7.14.



Probe 10:1
0.01 V/Div
Vertical
oscillation

Fig 7.14

7.2.6.4 DY and Vidicon Location

(1) Connect the 33kΩ R jumper across resistor R33 on the Def and Power PCB (CA 4501A) to lower the vertical centre of the vidicon raster

(2) Shoot the white pattern (in this instance both the pattern and camera body must be level)

(3) Check that the optical black (OB) line of the vidicon is horizontally aligned with the frame display of the pattern (or underscanning raster of the TV monitor) (See Fig 7.15)

(4) If the OB line is not horizontally aligned, loosen the screws securing the vidicon and turn the vidicon. When satisfactory, retighten the screws

(5) Remove the R jumper.

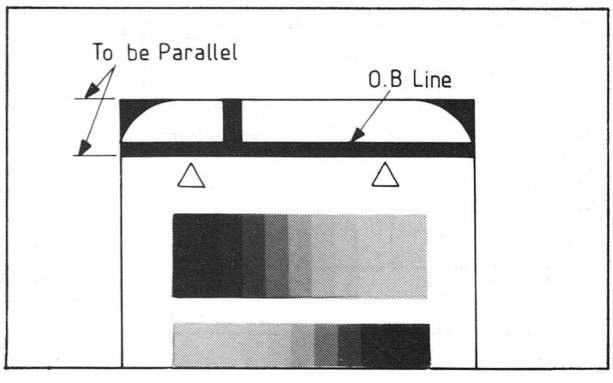


Fig 7.15

7.2.6.5 Horizontal Linearity and Amplitude

(1) Connect the oscilloscope probe via the γ jumper between terminals TP-1 and TP-E on the Video Process PCB (CA 1501A) as shown in Figure 7.16

(2) Shoot the white pattern and adjust the iris control mechanism as appropriate

(3) Turn R04 [H LIN] volume on the Def Power PCB (CA 4501A) to its mechanical centre, and similarly R42 [H SUB LIN] volume and L41 [H WIDTH] core on the Auxiliary PCB (CA 5501A)

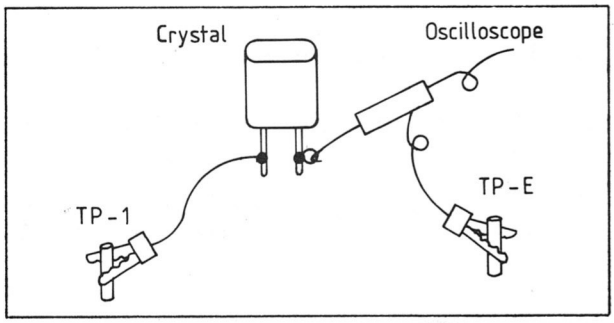


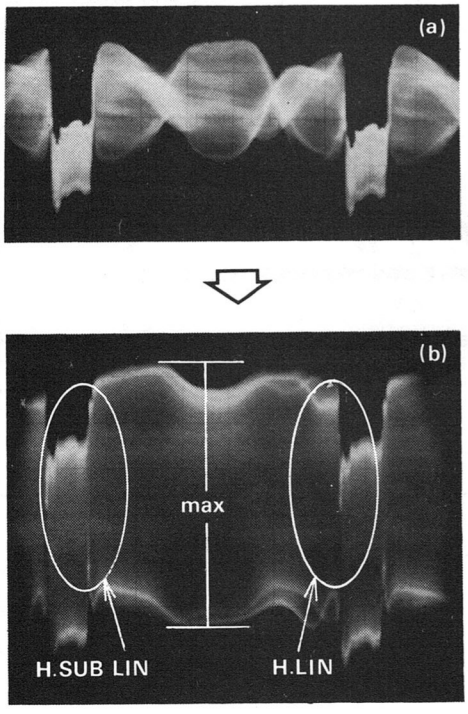
Fig 7.16

(4) Adjust L41 [H WIDTH] to achieve a waveform as shown in Figure 7.17(a)

(5) Adjust R04 [H LIN] and R42 [H SUB LIN] to achieve a waveform as shown in Figure 7.17(b). (In this case, adjust the controls to produce the maximum amplitude waveform)

(6) Readjust L41 [H WIDTH] until the amplitude of the waveform is a maximum flat level as shown in Figure 7.17(b)

(7) Remove the γ jumper.



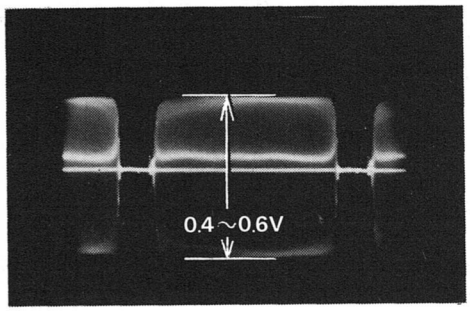
Probe 1:1
0.1V/Div
Horizontal
oscillation

Fig 7.17

7.2.6.6 DY Alignment

(1) Connect the oscilloscope probe between terminals TP-3 and TP-E on the Video Process PCB (CA 1501A)

(2) Shoot the white pattern and adjust the iris control mechanism to attain a voltage of between 0.4V and 0.6V. (See Fig 7.18)



Probe 10:1
0.01V/Div
Horizontal
oscillation

Fig 7.18

(3) Move the two alignment rings (Fig 7.19) of the DY until they are in line, then rotate them until the waveform shown in Figure 7.18 reaches a maximum

(4) Having obtained a maximum waveform, rotate each alignment ring independently to obtain the flatest waveform possible without sacrificing amplitude.

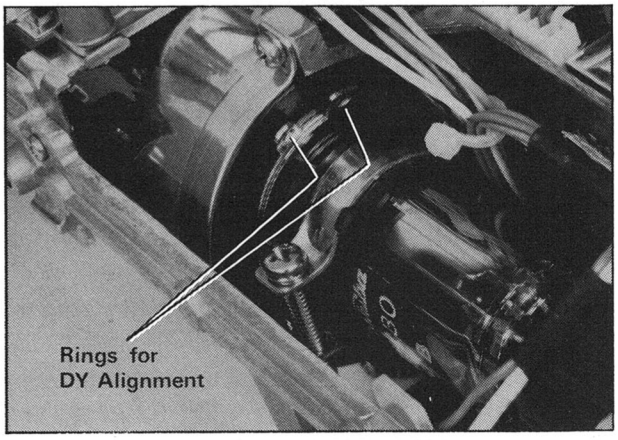


Fig 7.19

7.2.6.7 DY Location Adjustment
(Back Focus Adjustment)

NOTE If the DY is not correctly adjusted, the lens cannot be focussed.

(1) Loosen the two DY securing band screws and one DY screw as indicated by Figure 7.20

(2) Set the camera body level and shoot a subject such that the horizontal line can be confirmed on the TV monitor. Then, rotate the DY until the picture on the TV monitor is level

(3) When the DY horizontal line is correctly aligned, apply alignment markings to the DY and the body frame as shown by Figure 7.21

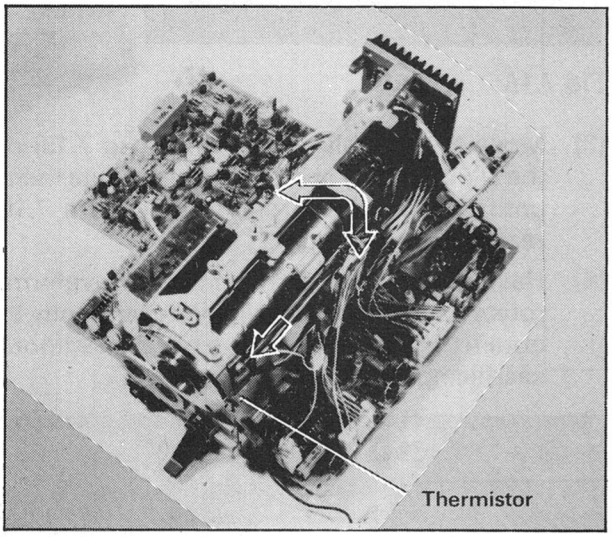


Fig 7.20 DY Securing Screws

(4) Shoot a dark subject at a distance of over 5m (16ft) while releasing the iris control mechanism

(5) Zoom in and adjust the focus control ring for the best focus

(6) Zoom out, taking care not to move the focus control ring, and shift the DY forwards and backwards to attain the optimum focus

(7) Repeat steps (5) and (6) a number of times to determine the optimum position

(8) Align the markings made at step (3) and alternately tighten the DY and DY securing band screws, taking extreme care in order to prevent forwards or backwards movement (check that the thermistor is correctly installed).

7.2.6.8 Vidicon Dark Current Readjustment

(1) Effect the procedure detailed in Section 7.2.6.1

(2) Adjust R10 [TARGET] volume until the amplitude of the waveform shown in Figure 7.11 is 0.04V.

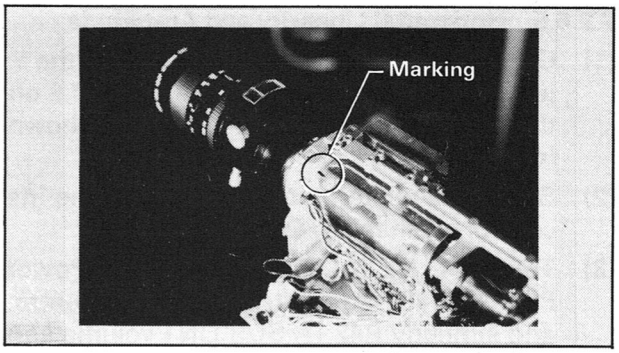


Fig 7.21 DY and Body Frame Alignment Marking

7.2.6.9 Preset Vidicon Beam Current Readjustment

(1) Effect the procedure detailed in Section 7.2.6.2

(2) Adjust R12 [BIAS] volume until the amplitude of the waveform shown in Figure 7.13 is 2V.

7.2.6.10 Focus Readjustment

(1) Effect the procedure detailed in Section 7.2.6.3.

7.2.6.11 Horizontal Centre and Vertical Amplitude

(1) Connect the 33KΩ R jumper across resistor R33 on the Def and Power PCB (CA 4501A) in order to lower the vertical centre of the vidicon raster

(2) Use the zoom lens to take a close-up shot of the grey-scale pattern (with frame marks)

(3) Adjust R05 [H CENT] on the Def and Power PCB (CA 4501A) until the centre marker is positioned at the centre of the TV monitor as shown in Figure 7.22

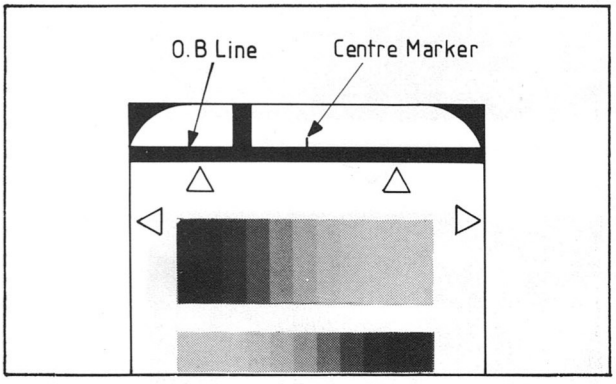


Fig 7.22

(4) Set R42 [V CENT] volume on CA 4501A to its mechanical centre

(5) Remove the R jumper

(6) Turn the zoom ring so that the horizontal frame markers on the grey scale pattern are correctly aligned with the horizontal under-scanning raster appearing on the TV monitor

(7) Adjust R32 [V HEIGHT] volume on CA 4501A so that the vertical frame markers are correctly aligned with the vertical under-scanning raster.

Upon completion of the preceding procedure, adjustment of the vidicon raster is complete (see Fig 7.23).

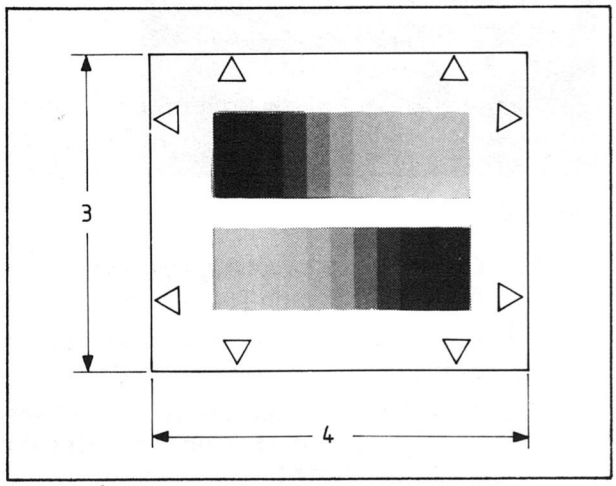


Fig 7.23

7.2.6.12 Vertical Centre

(1) Connect the RC jumper between terminals TP-1 and TP-E on the Video Process PCB (CA 1501A), then connect the oscilloscope probe to a neutral point of the jumper as shown in Figure 7.24

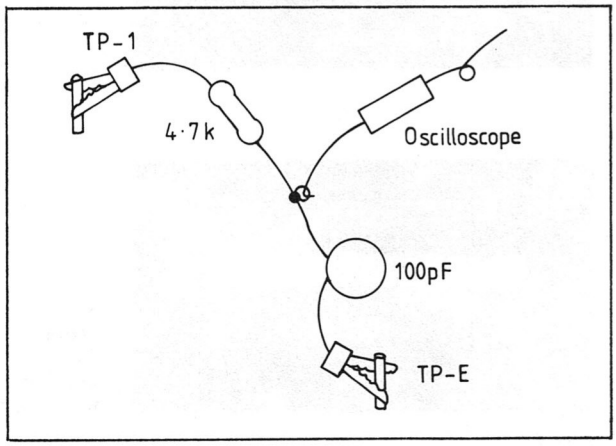
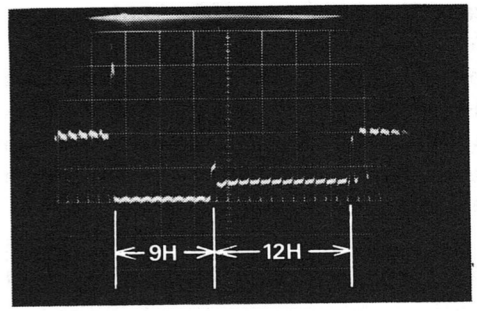


Fig 7.24 Oscilloscope Probe Connection for Vertical Centre Adjustment

(2) Shoot the white pattern and adjust the iris control mechanism as appropriate

(3) Starting from vertical retrace, adjust R42 [V CENT] volume on the Def and Power PCB (CA 4501A) at the 12th horizontal retrace as shown in Figure 7.25

(4) Remove the RC jumper



Probe 1:1
0.1 V/Div
0.2m Sec.

Fig 7.25

NOTES

(1) On completion of the vertical centre adjustment procedure, secure both the Def and Power PCB (CA 4501A) and the Auxiliary PCB (CA 5501A) with their screws. When securing CA 4501A, remember to connect the ring ground wire terminal to the body with the appropriate securing screw

(2) When securing CA 4501A take care to prevent disturbance of the R12 [BIAS] potentiometer. If the potentiometer is disturbed, readjust the preset vidicon beam current as described in section 7.2.6.9.

7.2.7 Signal Line Adjustment

Prior to adjusting the signal line, adjust the iris control mechanism to constantly maintain an input signal level from the vidicon through the preamplifier. Adjustments can then be made while covering the lens with the lens cap, without closing the iris control mechanism.

7.2.7.1 Presetting Iris Control Mechanism

(With AGC Switch Turned OFF)

(1) Connect the CR jumper between terminals TP-1 and TP-4 on the Video Process PCB (CA 1501A), then connect the oscilloscope probe to a neutral point of the jumper as shown in Figure 7.26

(2) Focus on the grey-scale pattern and adjust the iris control mechanism to achieve a waveform of amplitude 0.6V as shown in Figure 7.27

(3) Remove the RC jumper.

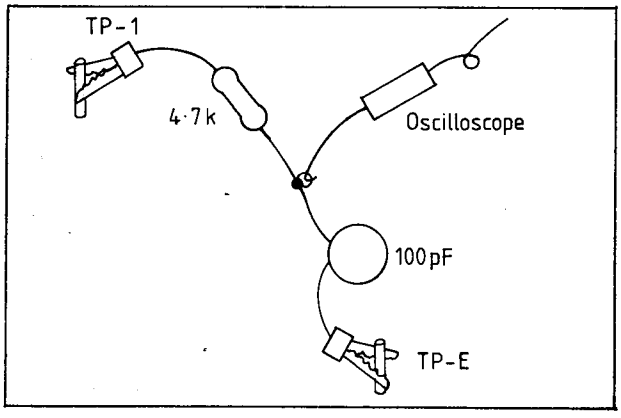
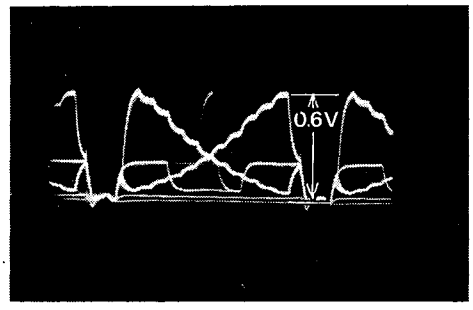


Fig 7.26



Probe 1:1
0.2 V/Div
Horizontal
oscillation

Fig 7.27

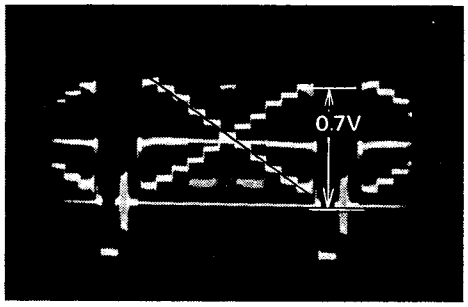
7.2.7.2 Y—γ Adjustment

(With AGC Switch Turned OFF)

(1) Effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the earth terminal

(3) Adjust VR13 [Y — γ ADJ] volume on the Video Process PCB (CA 1501A) until the step waveform shown in Figure 7.28 forms a straight line.



Probe 1:1
0.2 V/Div
Horizontal
oscillation

Fig 7.28

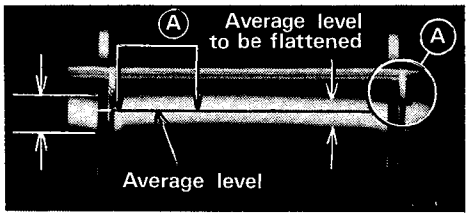
7.2.7.3 Optical Black Level Adjustment

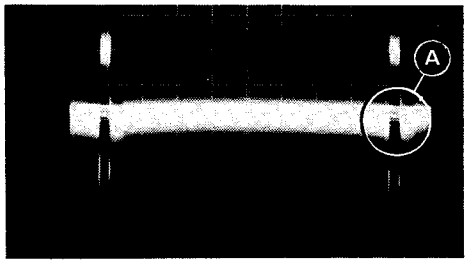
(With AGC Switch Turned OFF)

(1) Cap the lens (or close the iris control mechanism)

(2) Connect the oscilloscope probe between terminals TP-2 and TP-E on the Video Process PCB (CA 1501A)

(3) Adjust VR02 [OB ADJ] potentiometer on CA 1501A in order to equalize step Ⓐ shown in Figure 7.29.





Probe 1:1
0.02 V/Div
Vertical
oscillation

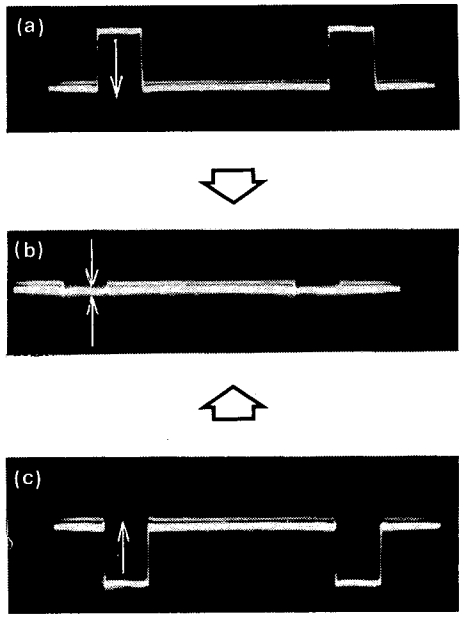
Fig 7.29

7.2.7.4 Presetting Pedestal Level
(With AGC Switch Turned OFF)

(1) Cap the lens (or close the iris control mechanism)

(2) Connect the oscilloscope probe between terminals TP-2 and TP-E on the Video Process PCB (CA 1501A)

(3) Adjust VR12 [PEDESTAL SET] volume on CA 1501A to achieve a waveform as shown in Figure 7.30. Since either side may be displaced from zero, adjust it to zero.



Probe 1:1
0.2 V/Div
Horizontal
oscillation

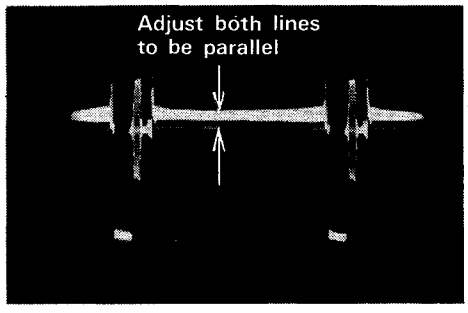
Fig 7.30

7.2.7.5 Line Tilt Adjustment
(With AGC Switch Turned OFF)

(1) Cap the lens (or close the iris control mechanism)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the GND terminals on the SSG and Encoder PCB (CA 3501A)

(3) Adjust VR01 [SHADING CORRECTION] potentiometer on the Video Process PCB (CA 1501A) so that the signal level can be maintained in parallel with the zero level as shown in Figure 7.31.



Probe 1:1
0.1 V/Div
Horizontal
oscillation

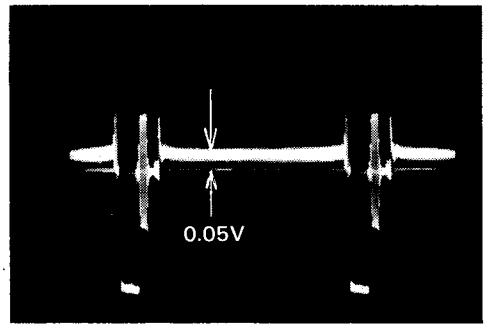
Fig 7.31

7.2.7.6 Y Setup Adjustment
(With AGC Switch Turned OFF)

(1) Cap the lens (or close the iris control mechanism)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the GND terminals on the SSG and Encoder PCB (CA 3501A)

(3) Adjust VR21 [Y SET UP] volume on the Video Process PCB (CA 1501A) until the Y setup is at 0.05V as shown in Figure 7.32.



Probe 1:1
0.1 V/Div
Horizontal
oscillation

Fig 7.32 Y Setup Adjustment

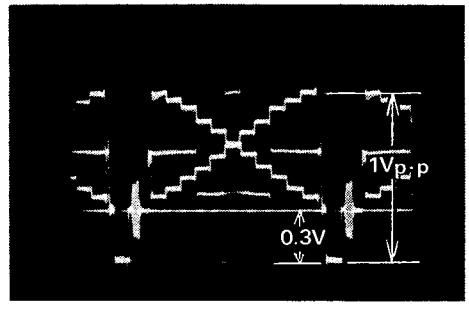
7.2.7.7 Y-Gain Adjustment
(With AGC Switch Turned OFF)

(1) Remove the lens cap to focus on the grey-scale pattern, full scale, and effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the GND terminals on the SSG and Encoder PCB (CA 3501A)

(3) Confirm that the synchronous signal level of the output waveform is maintained at approximately 0.3V

(4) Adjust VR22 [Y GAIN] potentiometer on the Video Process PCB (CA 1501A) to set the Y-gain at 1V p-p as shown in Figure 7.33.



Probe 1:1
0.2 V/Div
Horizontal
oscillation

Fig 7.33 Y Gain Adjustment

7.2.7.8 AGC Adjustment
(With AGC Switch Turned ON)

(1) Remove the lens cap to focus on the grey-scale pattern, full pattern, and effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the GND terminals on the SSG and Encoder PCB (CA 3501A)

(3) Adjust VR11 [AGC] volume on the Video Process PCB to set AGC at 1V p-p as shown in Figure 7.32

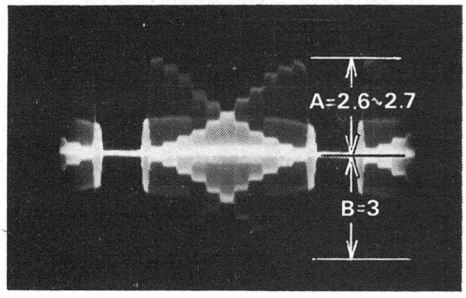
(4) Alternately, turn the AGC switch ON and OFF to check the 1V p-p.

7.2.7.9 (2R + B) Phase Adjustment
(With AGC Switch Turned OFF)

(1) Remove the lens cap to focus on the grey-scale pattern, and effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) Connect the oscilloscope probe between terminals TP-3 and TP-E located on the Video Process PCB (CA 1501A)

(3) Adjust C45 [PHASE SET] trimmer on CA 1501A to set the (2R + B) phase at A: B = 2.6 to 2.7:3 as shown in Figure 7.34.



Probe 10:1
(Be sure to use 10:1)
0.05 V/Div
Horizontal oscillation

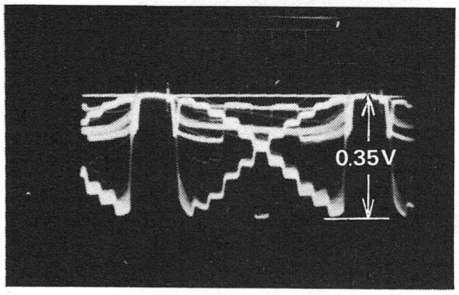
Fig 7.34

7.2.7.10 (2R + B) Gain Adjustment
(With AGC Switch Turned OFF)

(1) Remove the lens cap to focus on the grey-scale pattern and effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) Attach the red filter to the lens and connect the oscilloscope probe between terminals TP-5 and TP-E on the Video Process PCB (CA 1501A)

(3) Adjust VR41 [2R + B GAIN] volume on CA 1501A to set the (2R + B) gain to 0.4V as shown in Figure 7.35.



Probe 10:1
0.01 V/Div
Horizontal oscillation

Fig 7.35

7.2.7.11 Matrix Adjustment
(With AGC Switch Turned OFF)

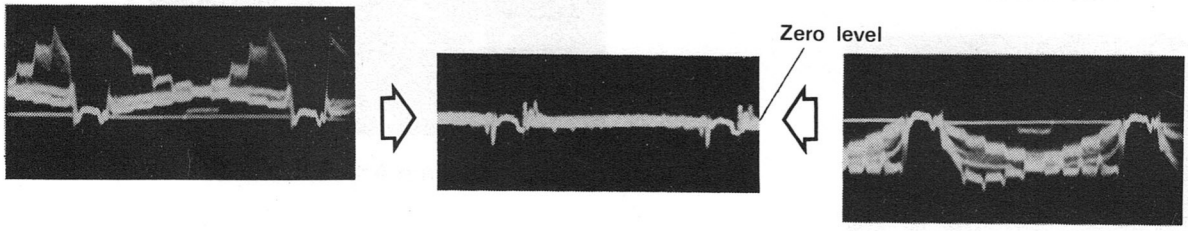
When adjusting the matrix immediately after adjusting the (2R + B) gain as in Section 7.2.7.10, effect the procedure detailed in step (2).

(1) Remove the lens cap to focus on the grey-scale pattern, and effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) Attach the red filter to the lens and connect the oscilloscope probe between terminals TP-4 and TP-E located on the Video Process PCB (CA 1501A)

(3) Adjust VR52 [B MATRIX] volume on CA 1501A to set the signal to near the zero level as shown in Figure 7.36

(4) Remove the red filter.



Probe 1:1
0.1 V/Div
Horizontal oscillation

Fig 7.36

7.2.7.12 Carrier Balance Adjustment
(With AGC Switch Turned OFF)

(1) Cap the lens (or close the iris control mechanism)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the GND terminals on the SSG and Encoder PCB (CA 3501A)

(3) Adjust VR 32 [LOW SET UP] potentiometer on the Video Process PCB (CA 1501A) in a direction such that no green appears on the TV monitor

(4) Adjust both of the [CARRIER BALANCE] potentiometers (R26 and R27) on the SSG and Encoder PCB (CA 3501A) and located on the underside of the body (Fig 7.38), to minimize the width as shown in Figure 7.37(a)

(5) Preset VR 32 [LOW SET UP] on CA 1501A immediately before sharply varying the signal (carrier) shown in Figure 7.37(b).

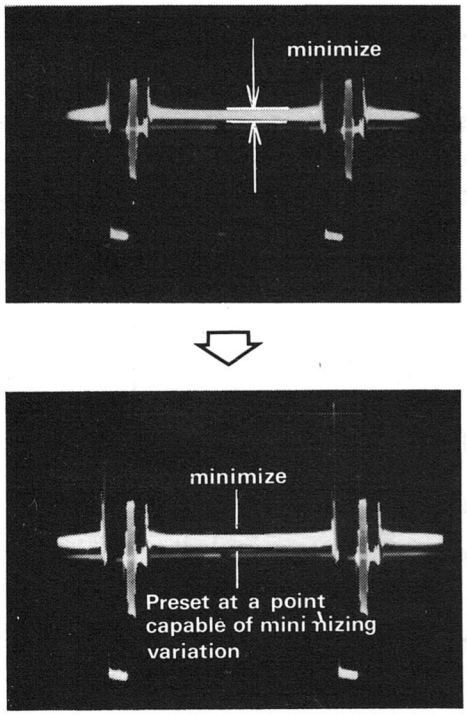


Fig 7.37

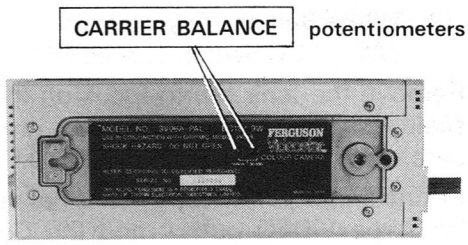


Fig 7.38 Location of [CARRIER BALANCE] pots

7.2.7.13 Burst Signal Amplitude Adjustment

(1) Cap the lens (or close the iris control mechanism)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the GND terminals on the SSG and Encoder PCB (CA 3501A)

(3) Adjust R53 [CHROMA GAIN] volume on CA 3501A to set the synchronous signal and its amplitude at 0.3V p-p, as shown in Figure 7.39.

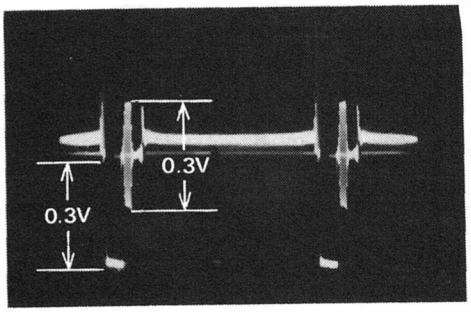


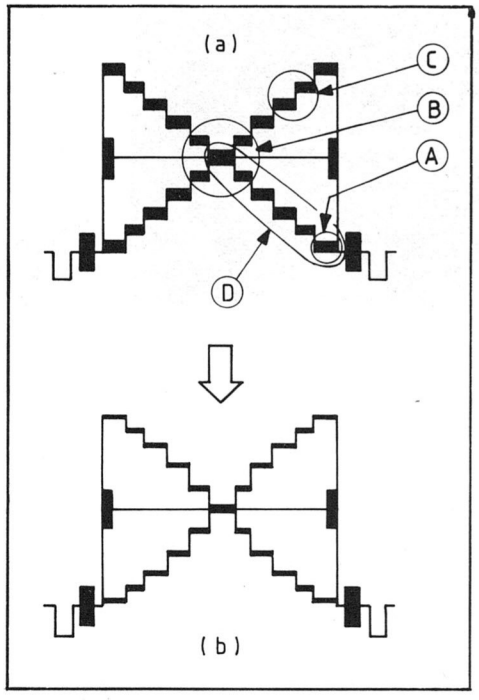
Fig 7.39

7.2.7.14 White Balance Adjustment
(With AGC Switch Turned OFF)

(1) Remove the lens cap to focus on the grey-scale pattern, and effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) Connect the oscilloscope probe between the PAL-type VIDEO output and the GND terminals on the SSG and Encoder PCB (CA 3501A)

(3) Adjust the waveform shown in Figure 7.40(a) to that illustrated in Figure 7.40(b)
The VR31 [LOW SET], VR32 [LOW SET UP], VR33 [LOW GAIN] and VR53 [B GAIN] adjustments are provided on CA 1501A
   (a) Initially, adjust VR32 to minimize the amplitude of part Ⓐ (black level) shown in Figure 7.40 (a)
   (b) Adjust VR33 and VR53 to minimize the amplitude of part Ⓑ
   (c) Adjust VR31 to minimize the amplitude of part Ⓒ
   (d) Repeat procedures (a) through (c) to minimize the amplitude of part Ⓓ.



Probe 1:1
0.2 V/Div
Horizontal
oscillation

Fig 7.40

7.2.7.15 Delay Adjustment
(With AGC Switch Turned OFF)

(1) Remove the lens cap to focus on the grey-scale pattern, and effect the procedure detailed in Section 7.2.7.1 (TP-1 = 0.6V)

(2) While referring to the TV monitor, adjust T31 [DELAY ADJ] on CA 1501A so that the fringes are eliminated from edges A-A' and B-B' as shown in Figure 7.41.

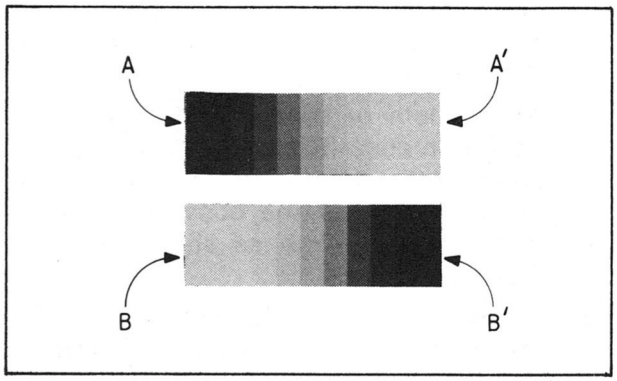


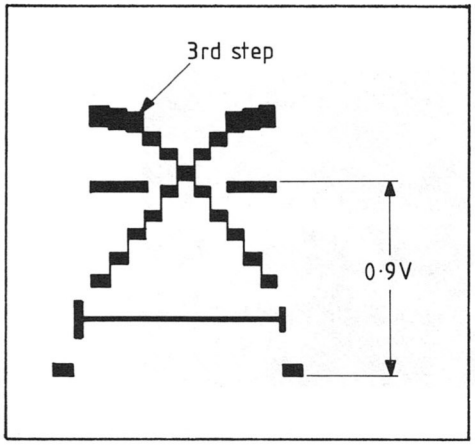
Fig 7.41

7.2.7.16 Chroma Limiter Adjustment

(1) Focus on the grey-scale pattern

(2) Adjust the iris control mechanism to attain a gain of 0.9V as shown in Figure 7.42

(3) Adjust R35 [CHROMA LIMITER] potentiometer on CA 3501A immediately before the signals of the third step are distorted as shown in Figure 7.42.



Probe 1:1
0.2 V/Div
Horizontal
oscillation

Fig 7.42

7.2.7.17 Carrier Balance Readjustment

(1) Restore all PCBs and secure each with its screws

(2) Readjust the carrier balance as detailed in Section 7.2.7.12.

7.2.7.18 Final Checks

(1) Check the vidicon and optical band elimination filter for dirt. Focus on the white pattern and zoom in. Adjust the iris approximately to f16 to check whether or not black spots appear on the TV monitor. If they do, remove all dirt deposited on the filter with a gentle jet of air and lens tissues

(2) Focus on an appropriate subject to check the colour image.

7.2.8 Automatic Exposure Voltage Zero Adjustment

This procedure is to be carried out only when the auto video circuit of the SSG and Encoder PBA (CA 3501A) is found to be defective.

(1) Connect a 150Ω resistor between connectors [R3] and [R4] on CA 3501A

(2) Connect the 8-pin connector on the viewfinder to the VF terminal

(3) Focus on the grey-scale pattern

(4) Connect the oscilloscope between terminal TP-1 and the GND terminal on CA 1501A

(5) Adjust the iris control mechanism to obtain a 0.6V waveform as shown in Figure 7.27

(6) Adjust R55 [AIC SET] on CA 3501A to a point where both the OVER and UNDER exposure display lamps in the viewfinder are off.

7.2.9 Electronic Viewfinder Adjustment

7.2.9.1 Brightness

(1) Adjust the brightness control (R78) for desired lightness or darkness of overall picture.

7.2.9.2 Contrast

(1) Adjust the contrast control (R72) so that the picture is as brilliant as required yet does not flicker excessively.

7.2.9.3 Focus

(1) Set the focus control (R51) for best overall definition and picture detail

(2) Reduce the brightness and check to make sure focus is satisfactory at all brightness levels.

7.2.9.4 Vertical Height and Linearity

(1) Set the receiving picture to crosshatch or a pattern with which symmetry can be checked

(2) Reduce the vertical size with the vertical height control (R08)

(3) Adjust the vertical linearity with the vertical linearity control (R02)

(4) Readjust the vertical height so that the picture is overscanned approximately ½" at the top and bottom of the screen.

7.2.9.5 Vertical Hold

(1) Adjust the vertical hold control (R06) to stabilize picture only if picture rolls up or down.

7.2.9.6 Horizontal Hold

(1) Set the horizontal hold control (R41) to the mechanical centre position

(2) Connect the jumper between TP-33A and TP-33B

(3) Adjust the horizontal hold control (R41) until picture is in view and locks, or drifts slowly back and forth

(4) Remove the jumper

(5) Make sure that the set maintains horizontal synchronization.

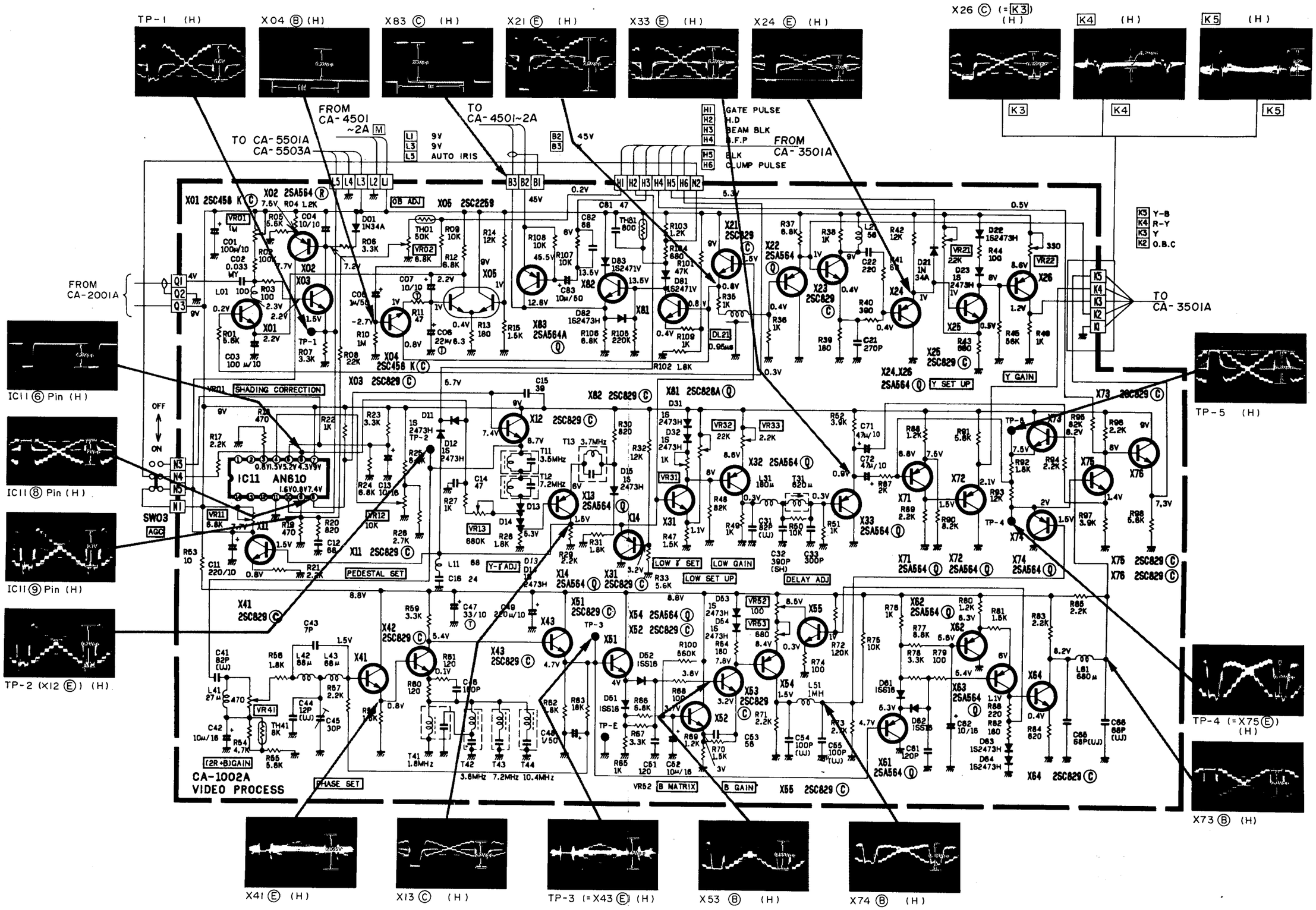


Fig 7.43 CA 1501A Circuit Diagram Test Information

Waveform: When focusing on the grey-scale pattern and adjusting the iris control as shown in TP-1 waveform of CA 1501A PCB.

Voltage: When closing the iris control.

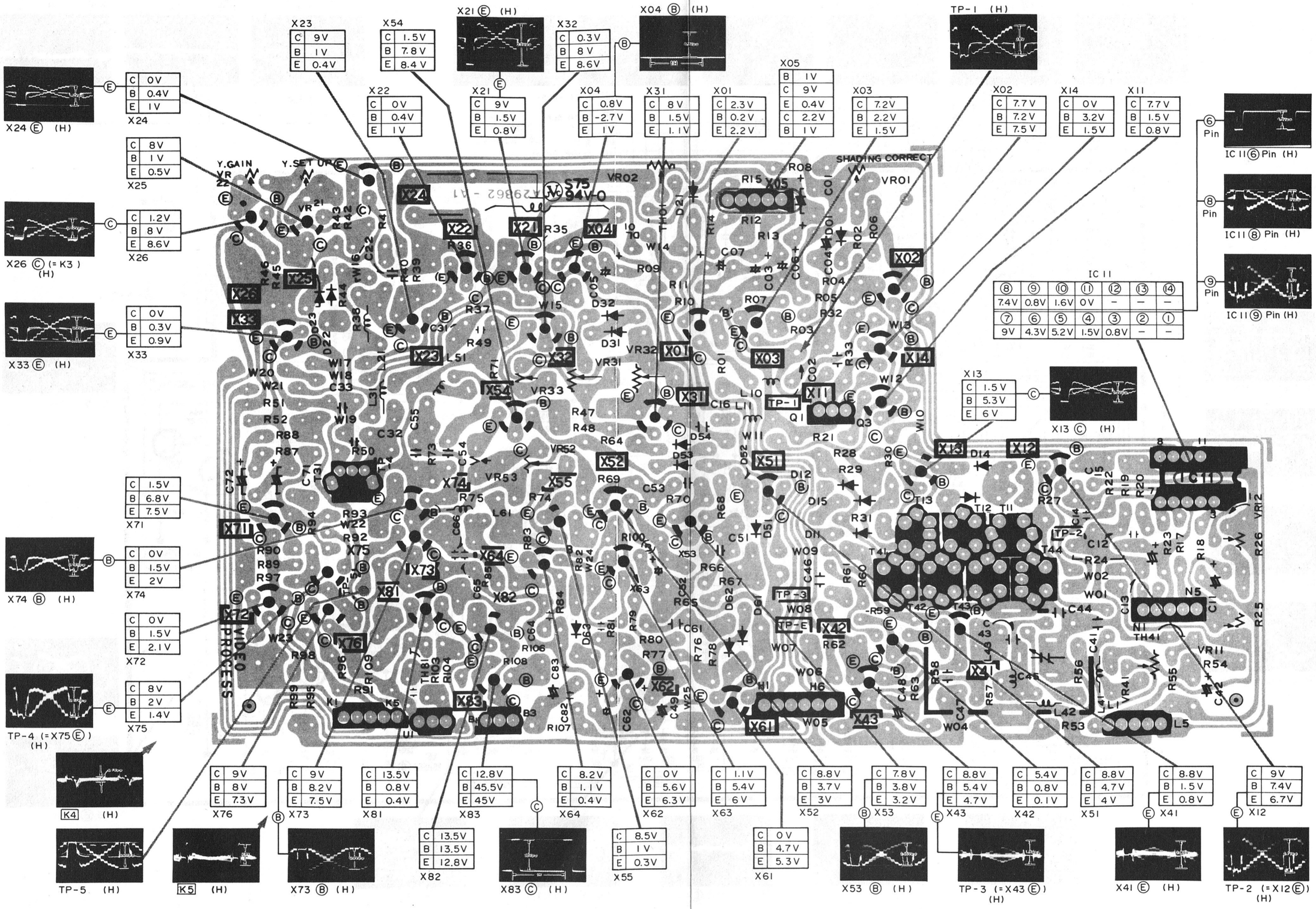


Fig 7.44 CA 1501A Printed Board Test Information

Waveform: When focusing on the grey-scale pattern and adjusting the iris control as shown in TP-1 waveform of CA 1501A PCB.

Voltage: When closing the iris control.

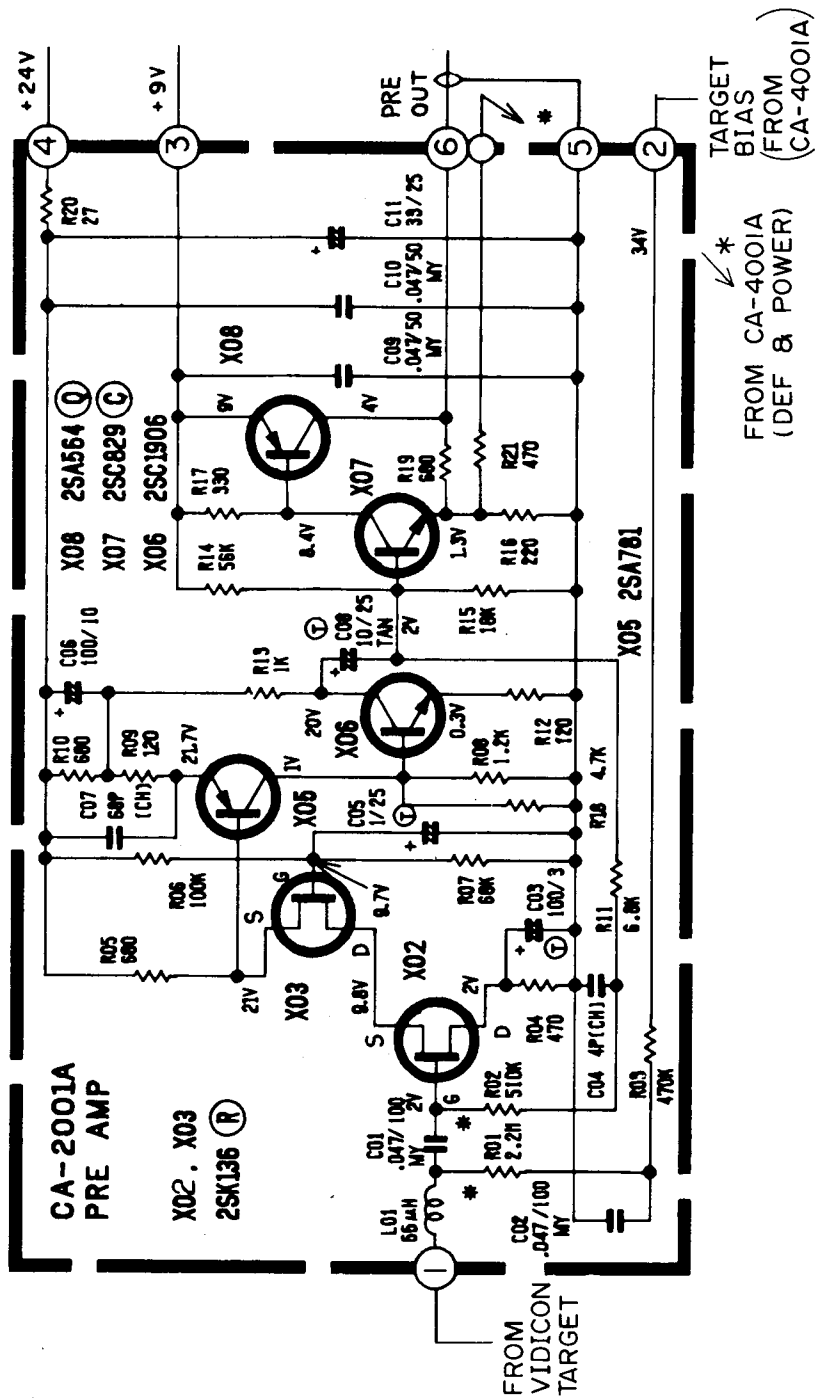


Fig 7.45 CA 2001A Circuit Diagram Test Information

Voltage: When closing the iris control.

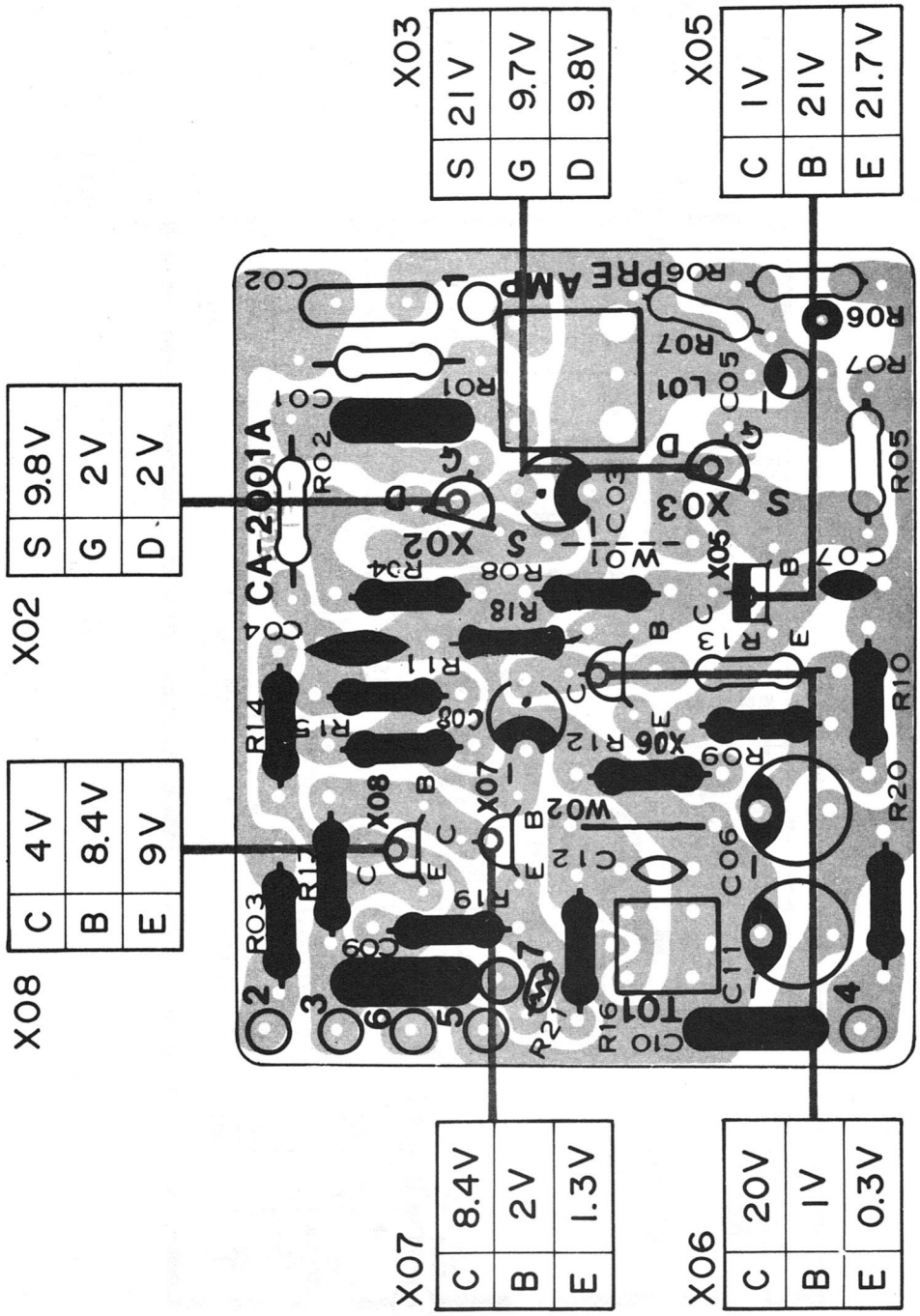


Fig 7.46 CA 2001A Printed Board Test Information

Voltage: When closing the iris control.

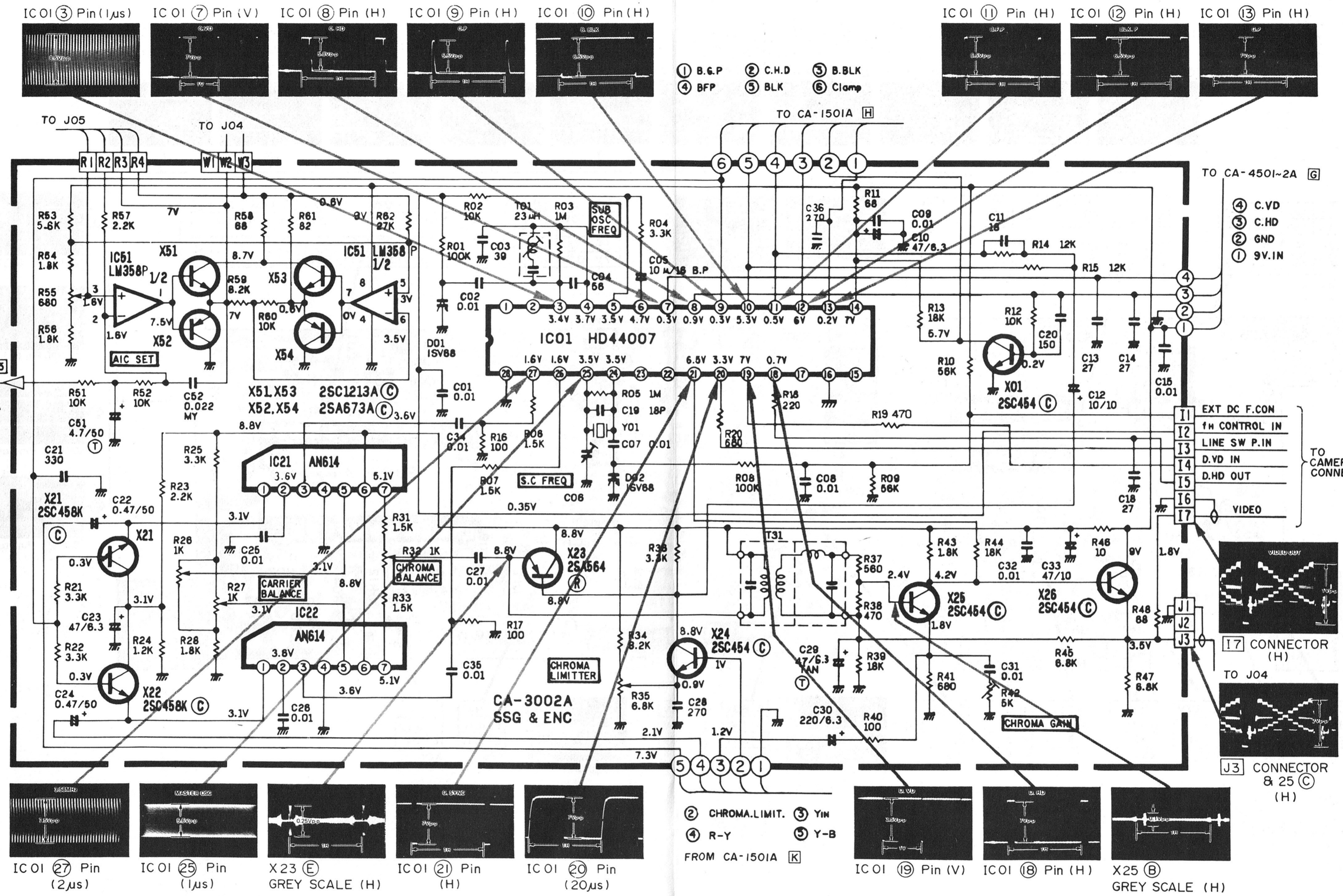
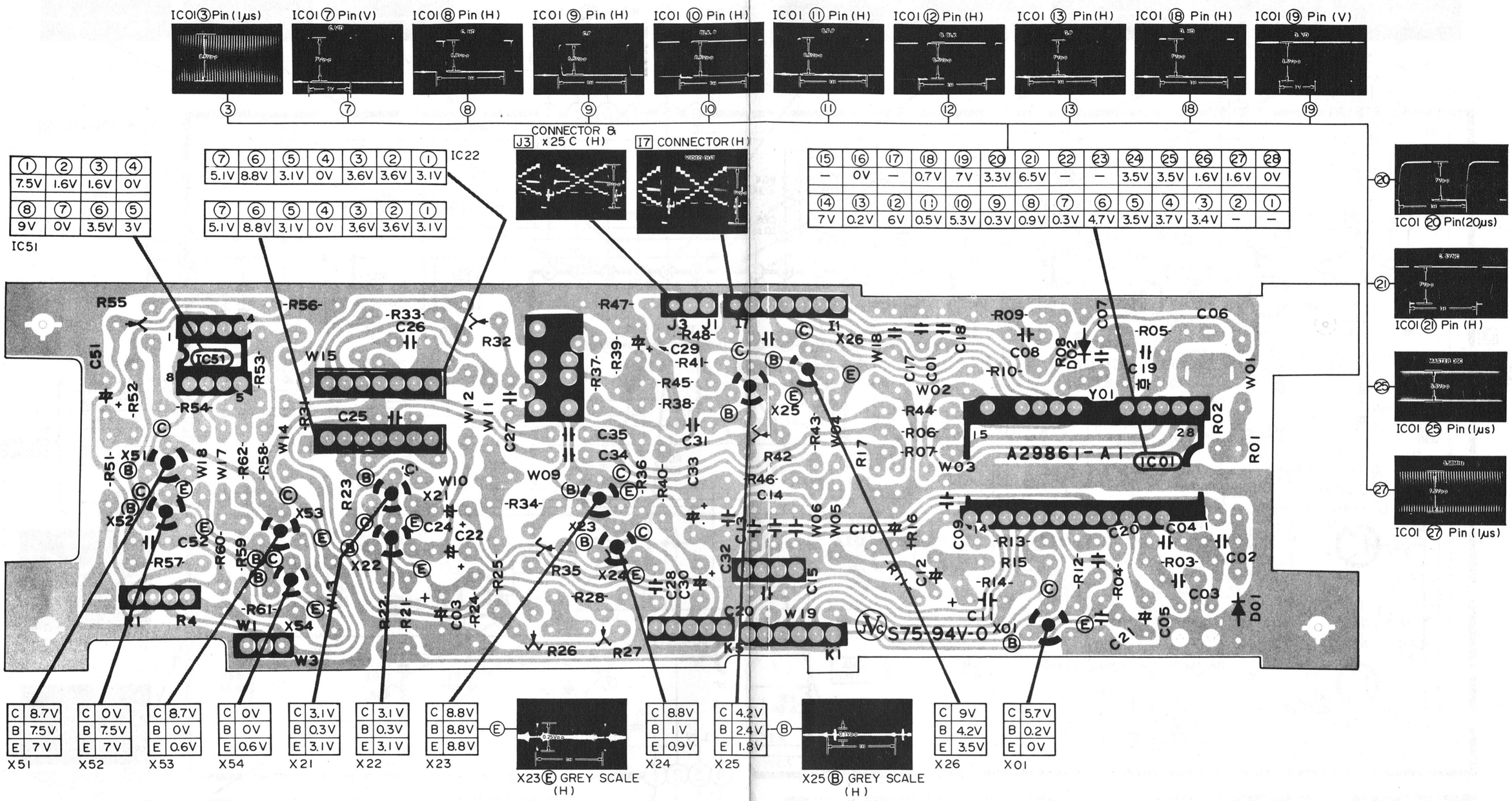


Fig 7.47 CA 3501A Circuit Diagram Test Information

Waveform: When focusing on the grey-scale pattern and adjusting the iris control as shown in TP-1 waveform of CA1501A PCB.

Voltage: When closing the iris control.



①	②	③	④
7.5V	1.6V	1.6V	0V
⑧	⑦	⑥	⑤
9V	0V	3.5V	3V

IC51

⑦	⑥	⑤	④	③	②	①
5.1V	8.8V	3.1V	0V	3.6V	3.6V	3.1V

IC22

⑦	⑥	⑤	④	③	②	①
5.1V	8.8V	3.1V	0V	3.6V	3.6V	3.1V

⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘
—	0V	—	0.7V	7V	3.3V	6.5V	—	—	3.5V	3.5V	1.6V	1.6V	0V
⑭	⑬	⑫	⑪	⑩	⑨	⑧	⑦	⑥	⑤	④	③	②	①
7V	0.2V	6V	0.5V	5.3V	0.3V	0.9V	0.3V	4.7V	3.5V	3.7V	3.4V	—	—

C	8.7V
B	7.5V
E	7V

X51

C	0V
B	7.5V
E	7V

X52

C	8.7V
B	0V
E	0.6V

X53

C	0V
B	0V
E	0.6V

X54

C	3.1V
B	0.3V
E	3.1V

X21

C	3.1V
B	0.3V
E	3.1V

X22

C	8.8V
B	8.8V
E	8.8V

X23

C	8.8V
B	1V
E	0.9V

X24

C	4.2V
B	2.4V
E	1.8V

X25

C	9V
B	4.2V
E	3.5V

X26

C	5.7V
B	0.2V
E	0V

X01

Fig 7.48 CA 3501A Printed Board Test Information

Waveform: When focusing on the grey-scale pattern and adjusting the iris control as shown in TP-1 waveform of CA 1501A PCB.

Voltage: When closing the iris control.

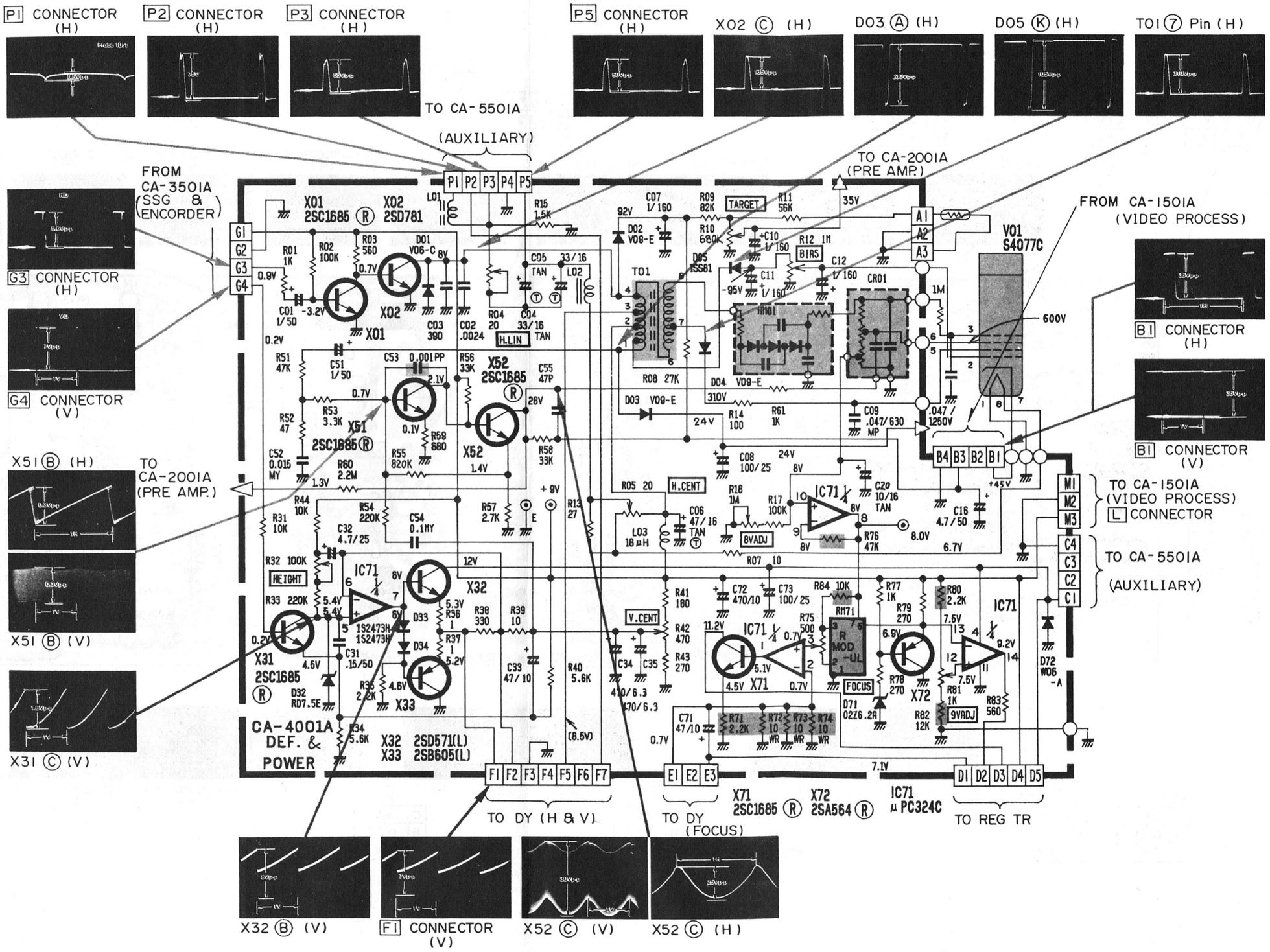


Fig 7.49 CA 4501A Circuit Diagram Test Information
Voltage/Waveform: When closing the iris control.

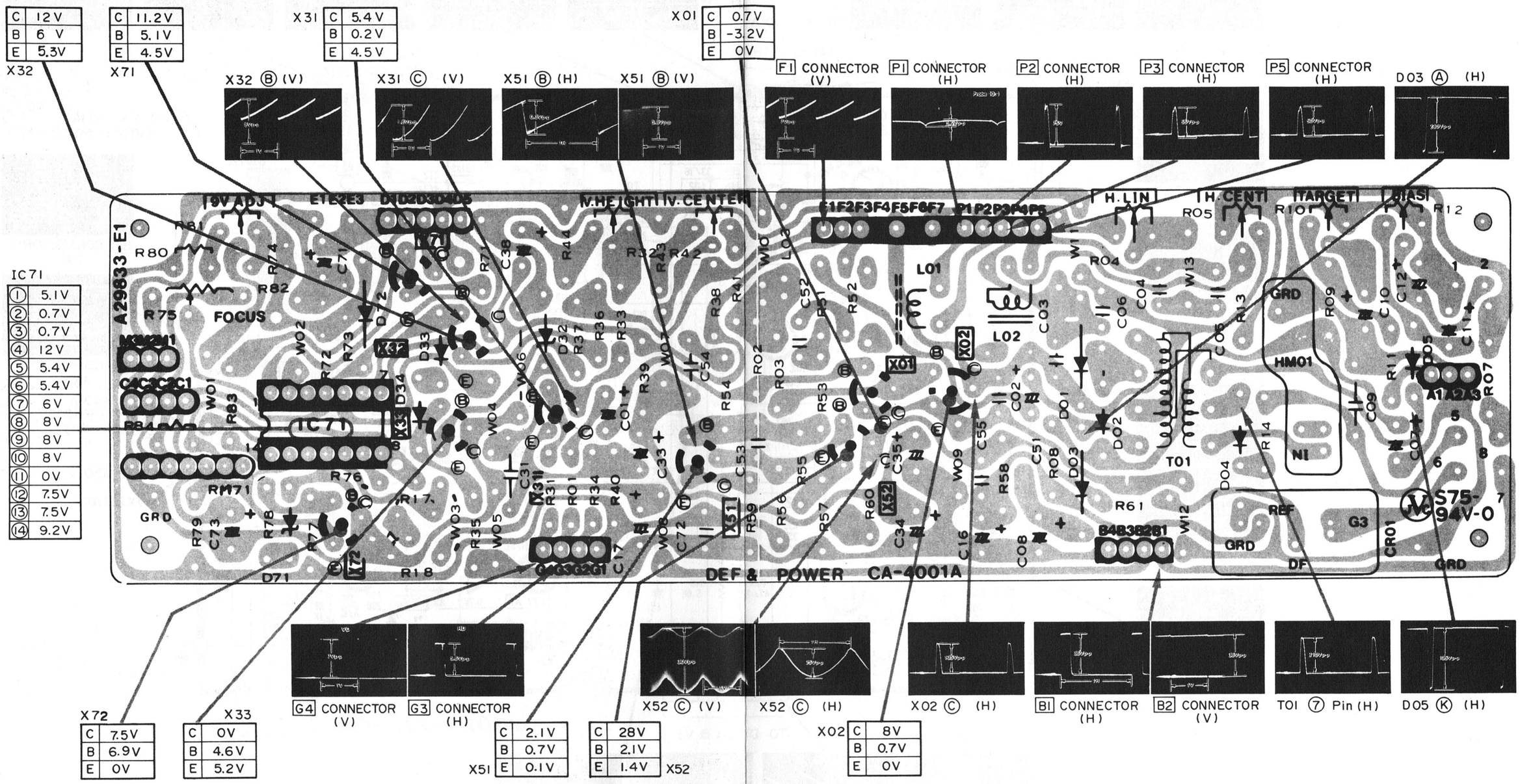


Fig 7.50 CA 4501A Printed Board Test Information

Voltage/Waveform: When closing the iris control.

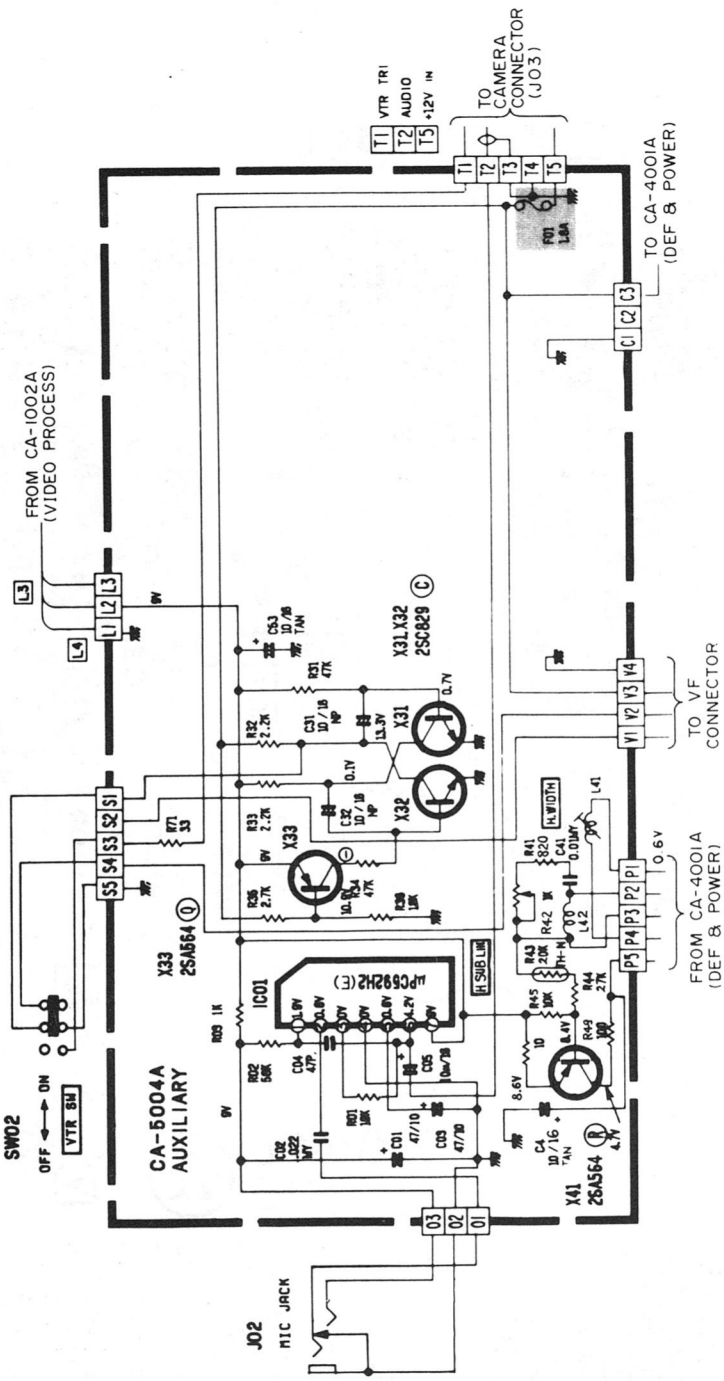


Fig 7.51 CA 5501A Circuit Diagram Test Information

Voltage/Waveform: When closing the iris control.

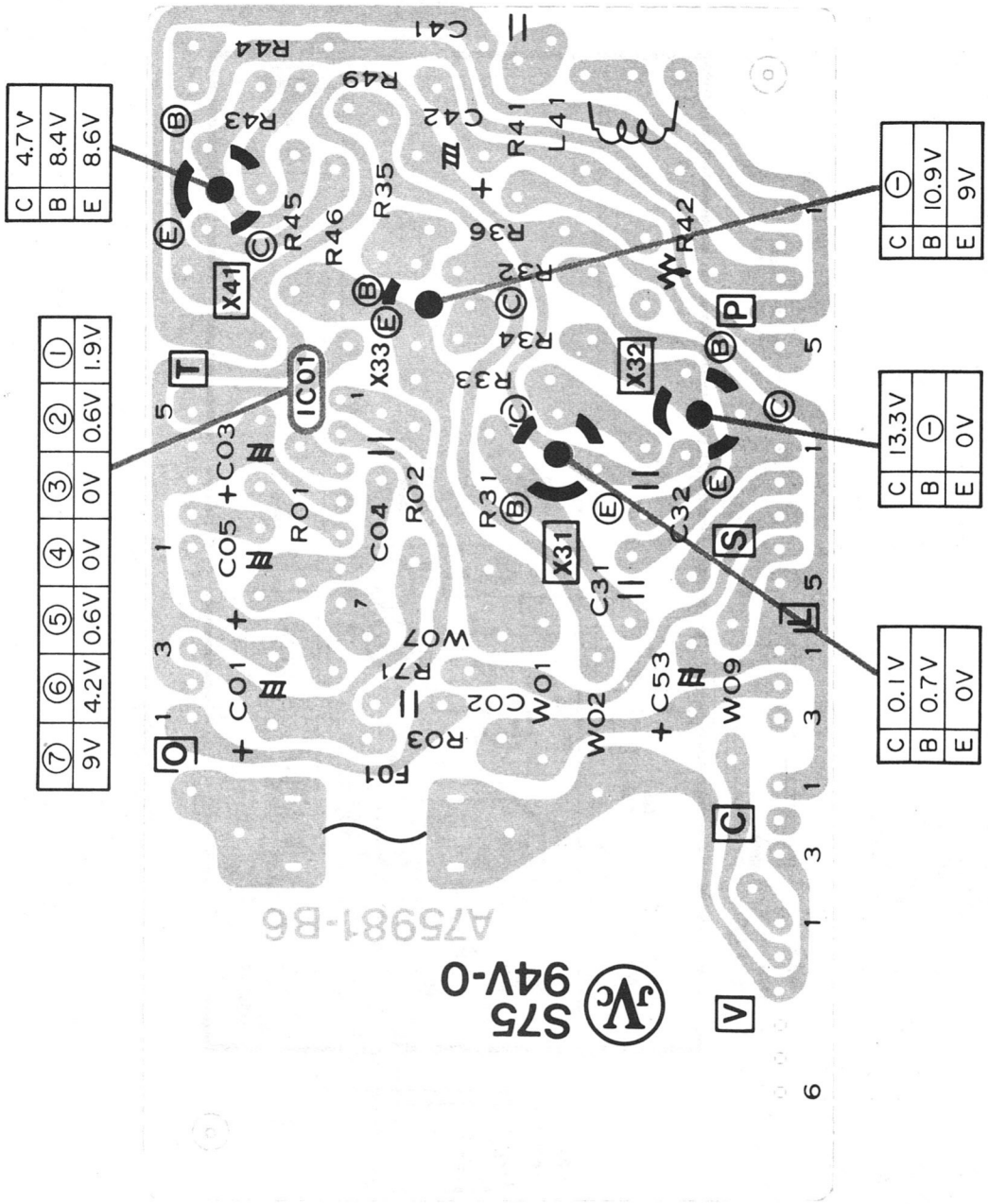


Fig 7.52 CA 5501A Circuit Diagram Test Information
Voltage/Waveform: When closing the iris control.

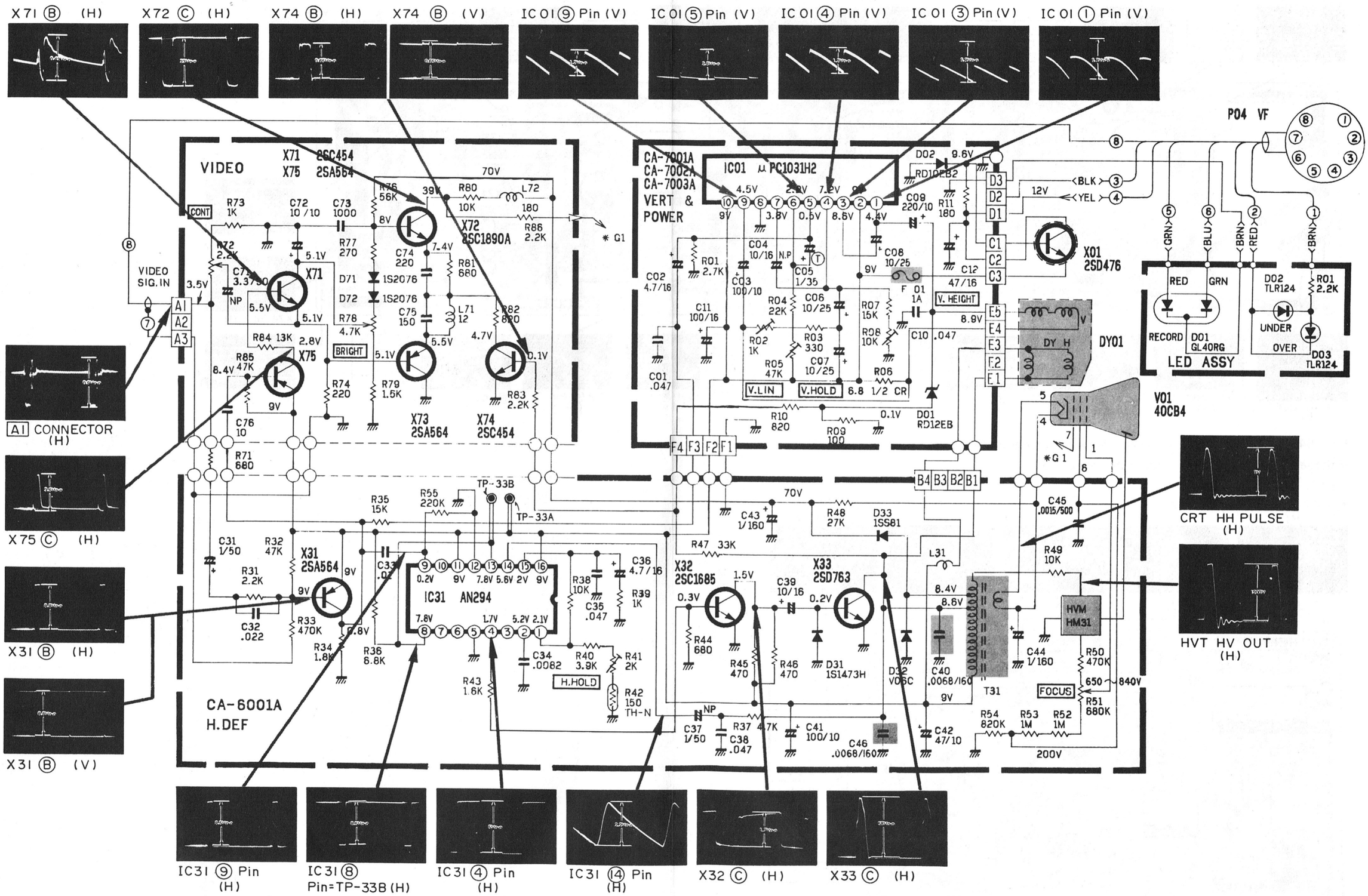
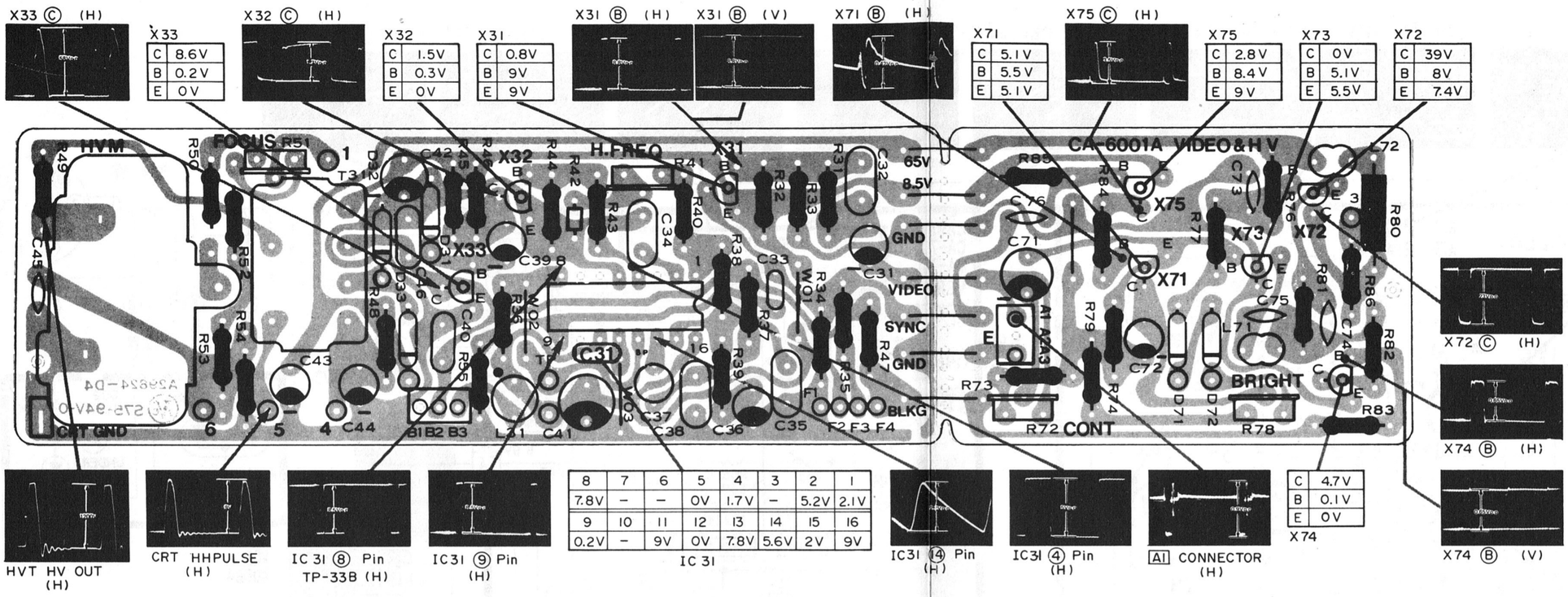


Fig 7.53 Electronic Viewfinder Circuit Diagram Test Information
Voltage/Waveform: When closing the iris control.



8	7	6	5	4	3	2	1
7.8V	–	–	0V	1.7V	–	5.2V	2.1V
9	10	11	12	13	14	15	16
0.2V	–	9V	0V	7.8V	5.6V	2V	9V

Fig 7.54 CA 6001A (Electronic Viewfinder) Printed Board Test Information

Voltage/Waveform: When closing the iris control.

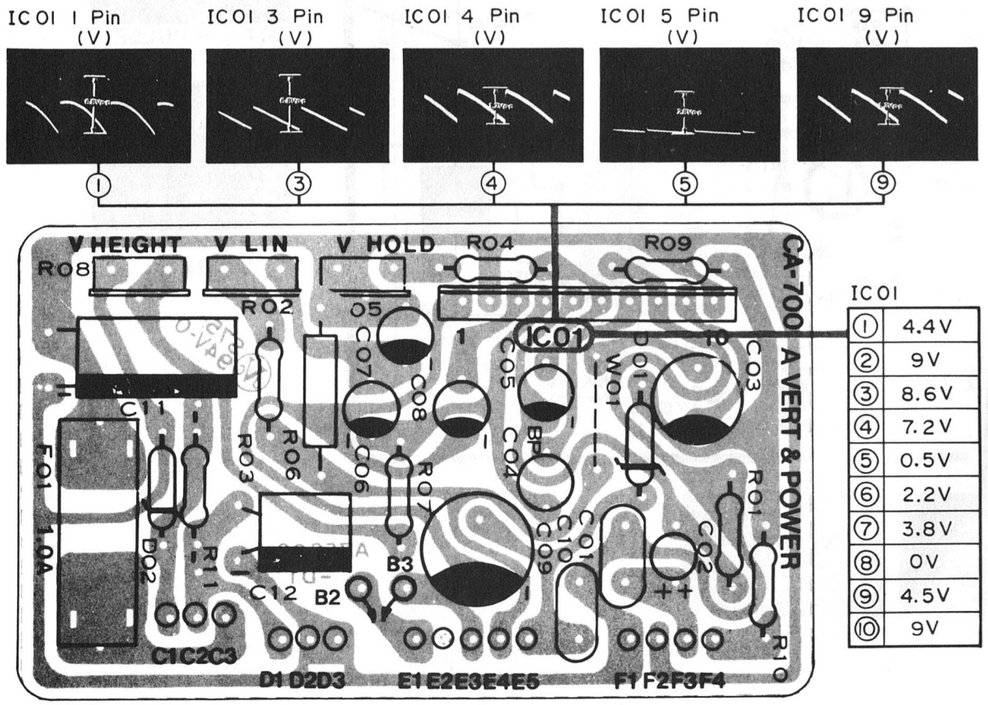


Fig 7.55 CA 7003A (Electronic Viewfinder) Printed Board Test Information

Voltage/Waveform: When closing the iris control.

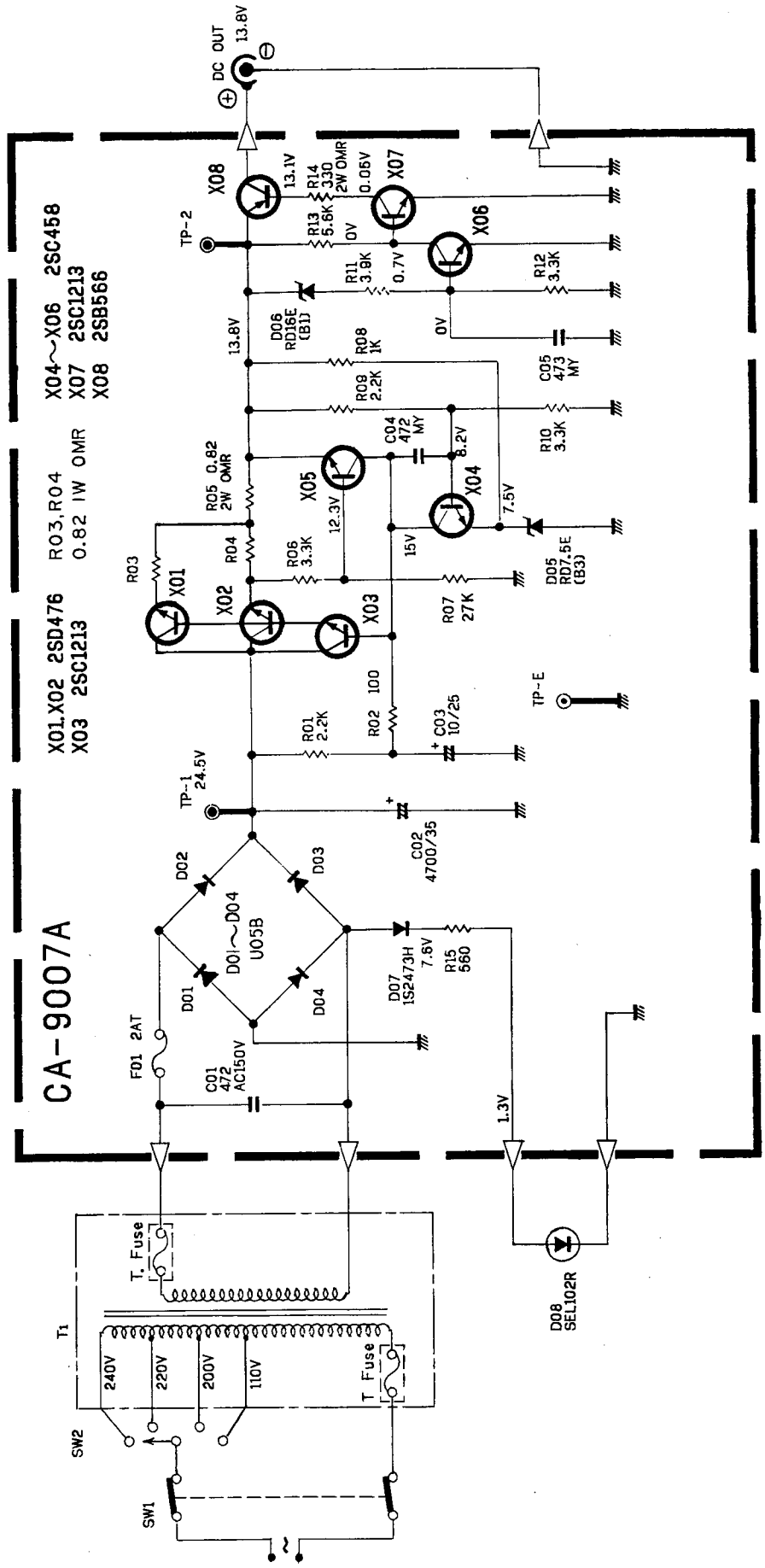


Fig 7.56 AC Adaptor Circuit Diagram

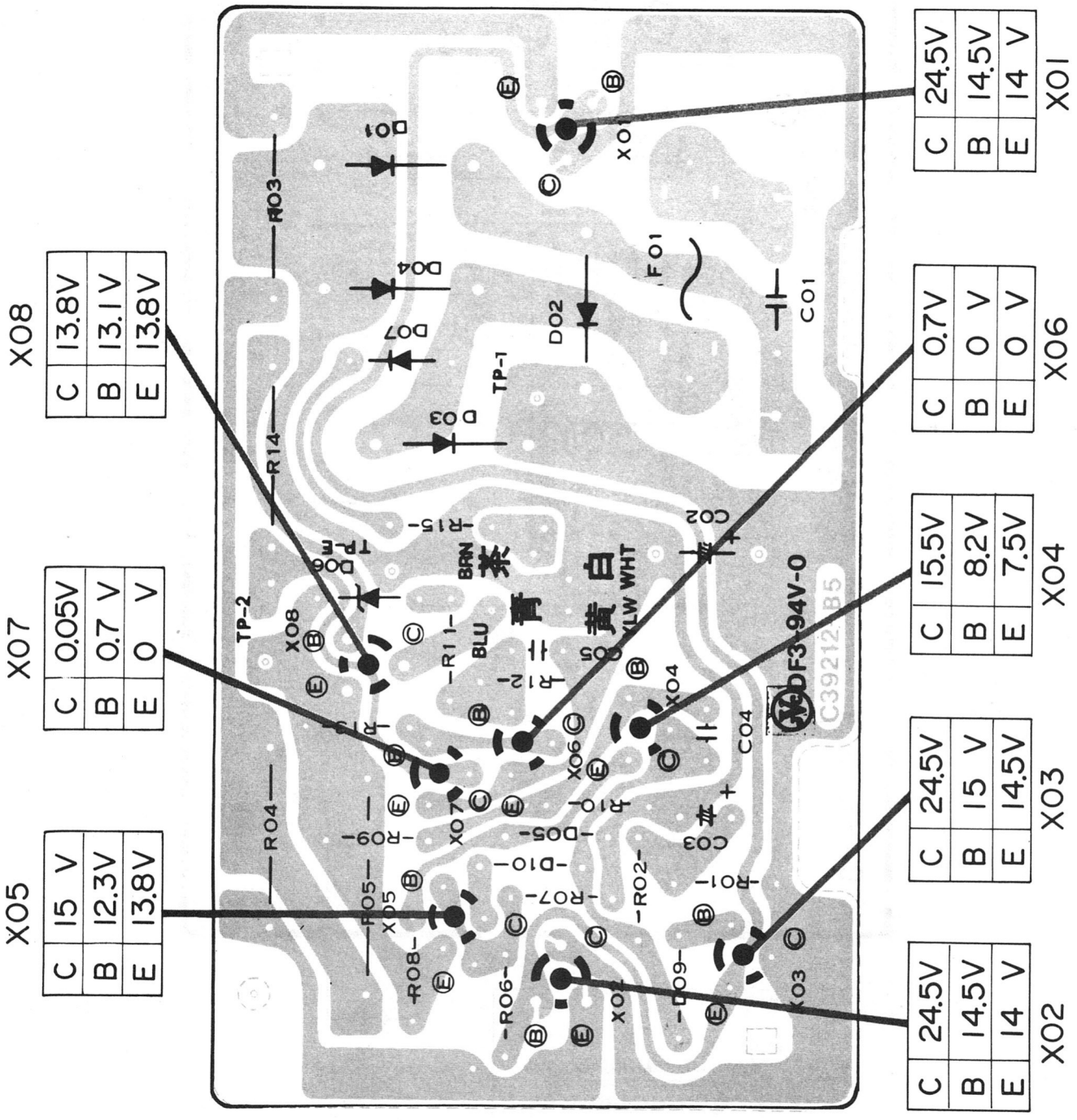


Fig 7.57 CA 9007A (AC Adaptor) Printed Board Test Information

8. PARTS LIST

USE ONLY THORN APPROVED REPLACEMENT PARTS

⚠ indicates critical safety components, and identical components should be used for replacement.

All other components have been selected after prolonged laboratory tests and in the interests of safety it is recommended that only Thorn Replacement Parts are used to ensure that any repairs do not reduce the high standards of original manufacture.

The Company will not accept responsibility if any replacement parts from a source other than TCE Service Division are used.

8.1 GENERAL

8.1.1 Resistors

All resistance values are in ohms, where

* K = 1,000 ohms
* M = 1,000,000 ohms

The following abbreviations are used to describe the resistors

*	CR	Carbon Resistor
*	Comp R	Composition Resistor
*	OMR	Oxide Metal Film Resistor
*	VR	Variable Resistor
*	MFR	Metal Film Resistor
*	CMFR	Coated Metal Film Resistor
*	UNFR	Nonflammable Resistor
*	FR	Fusible Resistor

Except where specifically stated, all resistors are ¼ Watt ±5% carbon resistors.

8.1.2 Capacitors

All capacitor values are either in pF or μF.
The following abbreviations have been used to describe the capacitors

*	C Cap	Ceramic Capacitor
*	M Cap	Mylar Capacitor
*	E Cap	Electrolytic Capacitor
*	BPE Cap	Bipolar (or non-polar) Electrolytic Capacitor
*	MM Cap	Metalized Mylar Capacitor
*	PP Cap	Polypropylene Capacitor
*	MPP Cap	Metalized Polypropylene Capacitor

The following abbreviations have been used to denote tolerances

*	A	+50%, −10%
*	H	+100%, −10%
*	J	±5%
*	K	±10%
*	M	±20%

The following are the standard capacitors employed

*	Ceramic	50V	±5%
		500V	±10%
		25V	+80%, −20%
		50V	+100%, −0
		500V	+100%, −0
		50V	±10%
*	Mylar	50V	±10%
		100V	±10%
		200V	±20%
*	Electrolytic	6.3V	+100%, −10%
		16V	+100%, −10%
		50V	+100%, −10%
		160V	+100%, −10%

8.2 SYSTEM ASSEMBLY

Reference Figure 8.1, Exploded View of Camera Body.

8.2.1 Camera Body (3V06A)

Exploded View No.	Identification No.	Part No.	Part Name	Remarks
1		01X0-016-094	Accessory-Shoe Screw	×1
2		01X0-016-092	Accessory-Shoe Spring	
3		01X0-016-132	Screw	×4
4		01X0-016-093	Accessory-Shoe	
5		01X0-016-133	Screw	×2
6		01X0-016-052	Top Cover	
7		01X0-016-134	Screw	×2
8		01X0-016-050	Front Cover	
9		01X0-016-134	Screw	×2
10		01X0-016-049	Body Cover (LEFT)	
11		01X0-016-090	Leather (LEFT)	simulated
12		01X0-016-135	Mark	
13		01X0-016-134	Screw	×2
14		01X0-016-048	Body Cover (RIGHT)	
15		01X0-016-091	Leather (RIGHT)	simulated
20		01X0-016-136	Top Beam	Top cover bracket
21		01X0-016-137	Screw	×2
22		01X0-016-138	Screw	×1
23		01X0-016-139	Screw	×1
24		01X0-016-140	Screw	×1
25		01X0-016-141	Beam Bracket	
26		01X0-016-051	Heat Sink	
27		01X0-016-142	Heat Insulator	
28		01X0-016-143	Heat Insulator	
29		01X0-016-138	Screw	×1
30		01X0-016-144	Screw	×2
31		01X0-016-145	Deflection Yoke Band	
32	DY01	01X0-016-102	Deflection Yoke	⚠
33	V01	01X0-016-095	Vidicon Tube	⚠
34		01X0-016-146	Set Screw	×1
35		01X0-016-147	Thermistor Holder	
36	R01	01X0-016-119	Thermistor	
37		01X0-016-137	Screw	×4
38		01X0-016-148	C Mount Plate	
39		01X0-016-149	Screw	×4
40		01X0-016-150	Filter Holder	
41		01X0-016-120	Filter Assembly	
42		01X0-016-043	Filter Cap	
43		01X0-016-042	Switch Knob Assembly	VCR Knob
44		01X0-003-167	Assembly Screw	×1
45		01X0-016-151	Switch Bracket	
46		01X0-016-088	Switch Spring	
47		01X0-003-167	Assembly Screw	×1
48		01X0-016-077	Slide Switch	AGC Switch
49A		01X0-016-152	Switch Shade	
49B		01X0-016-153	Switch Board	

Exploded View No.	Identification No.	Part No.	Part Name	Remarks
50		01X0-016-086	View Finder Screw	
51		00X4-286	Screw	×2
52	SW02	01X0-016-076	Push Switch	VCR Switch
53		00X4-296-001	Screw	
54	J04 & J05	01X0-016-078	Socket Assembly	unified VF & IRIS
55		01X0-016-154	Screw	×2
56		01X0-016-155	Joint Bracket	
57		01X0-016-156	Tap Screw	×4
58		01X0-016-157	Hinge Assembly	×4
59		01X0-016-089	Name Plate	
60			Tube Socket Service Assembly	for Vidicon ⚠
		01X0-016-070	Tube Socket	
	R02	01X0-016-158	Carbon Resistor	1 MΩ 1/4 W ±5%
	C02	01X0-016-159	MPP Capacitor	0.07μF 1250V ⚠
61	SW01	01X0-016-039	DC Switch	with Nut (Power Sw)
62		01X0-016-160	Washer	
63		01X0-016-161	Switch Plate	
64	J01 & J02	01X0-016-038	Jack Assembly	DC IN & MIC
65		01X0-016-162	Screw	×2
66		01X0-016-163	Connector Bracket	×2
67		01X0-016-164	Transistor Bracket	
68		01X5-474-240	Screw	×1
69		01X0-016-165	Mica Sheet	
70		01X0-016-992	Printed Board Assembly	included X01 & X02
	X01	01X0-016-029	Transistor	Power Regulator
	X02	01X0-016-029	Transistor	Focus Regulator
71	J03	01X0-016-118	12 Pin Socket	VCR CONNECTOR
72		01X0-008-123	Earth Lug	
73	C01	00X4-786	Mylar Capacitor	0.1μF 50V
74		01X0-016-087	Rear Plate Assembly	
75		01X0-016-166	Box Chassis Assembly	
84		01X0-016-995	PCB Assembly	Signal Process
85		01X0-003-768	Screw	×2
86		01X0-016-996	PCB Assembly (Pre Amp)	with Shield Case
87		01X0-016-167	Screw	×4
88		01X0-016-997	PCB Assembly	S.S.G. & Encoder
89		01X0-003-768	Screw	×4
90		01X0-016-168	Top Shield	upperside
91		01X0-016-169	Bottom Shield	underside
92		01X0-016-998	PCB Assembly	Deflection & Power ⚠
93		01X0-003-768	Screw	×2
94		01X0-016-999	PCB Assembly	Auxiliary ⚠
95		01X0-003-768	Screw	×2
96		01X0-016-170	Harness Band	×5

8.2.2 Base Assembly (3V06B)

Exploded View No.	Identification No.	Part No.	Part Name	Remarks
97		01X0-016-603	Case	
98		01X0-016-604	Handle	
99		01X0-016-611	Leather	
100A		01X0-016-615	Tap Screw	×1
100B		01X0-016-616	Tap Screw	×1
101		01X0-016-605	Top Cover	
102		01X0-016-606	Cover A	
103A		01X0-016-608	Cover B	
103B		01X0-016-617	Cover Spring	
104		01X0-016-618	Level	
105A		01X0-016-619	Stud	
105B		01X0-003-743	E. Washer	×1
106		01X0-016-620	Belt	
107		01X0-016-621	Belt Holder A	
108		01X0-016-622	Belt Holder B	
109A		01X0-016-623	Plate Nut	
109B		01X0-016-624	Screw	×1
110		01X0-016-610	Knob Assembly	
111A		01X0-016-625	Spring	
111B		01X0-003-743	E. Washer	×1
112A		01X0-016-609	Terminal Assembly	for Plus
112B		01X0-016-612	Spring Base	for Minus
112C		01X0-016-626	Contact Spring	
113A		01X0-016-607	Microphone	
113B		01X0-016-627	Mic. Cushion	
113C		01X0-016-628	Mic. Shade	
114A		01X0-016-629	Mic. Bushing	
114B		01X0-016-613	Mic. Nut	
115A		01X0-016-602	Plug Assembly	for Microphone
115B		01X0-016-601	Plug Assembly	for DC
115C		01X0-016-630	Cord Bushing	with Nut
116A		01X0-016-631	Jack	for Charger
116B		01X0-016-632	Plate Nut	
116C		01X0-016-633	Screw	×2
117		01X0-016-614	Plate	
118		01X0-016-600	Fuse	2A ⚠
119		01X0-016-634	Cushion	for Shoulder Cushion

8.2.3 Zoom Lens

with auto iris and macro (3V06C)

Exploded View No.	Identification No.	Part No.	Part Name	Remarks
120			Zoom Lens	×6
121		01X0-016-004	Hood Cap	
122		01X0-016-005	Hood	
123		01X0-016-007	Dust Cap	
		01X0-016-218	Filter	
		01X0-016-219	Filter Case Assembly	

8.2.4 Electronic Viewfinder (3V06D)

Exploded View No.	Identification No.	Part No.	Part Name	Remarks
130		01X0-016-710	E. Viewfinder Case	Accessory Shoe Side
131		01X0-016-711	E. Viewfinder case	
132		01X0-016-723	Case Knob	
133		01X0-016-705	Visor	
134	P04	01X0-016-703	8 Pin Plug Assembly	
135		01X0-016-726	Bracket	
136		01X0-016-727	Washer	
137		01X0-016-728	Nut	
138			Electronic Viewfinder	
		01X0-016-729	Cord Bushing	×2
		01X0-016-730	Bushing	×1
		01X0-016-719	Lens	
		01X0-016-724	Mirror	
		01X0-016-731	Mirror Support	
		01X0-016-732	Spring	
		01X0-016-733	CRT Bracket	
	V01	01X0-016-709	CRT	1.5 inch
	DY01	01X0-016-722	Deflection Yoke	
		01X0-016-715	CRT Socket Assembly	
		01X0-016-706	LED (Green)	RECORD
		01X0-016-707	LED (Red)	×2 OVER & UNDER
		01X0-016-734	Carbon Resistor	2.2KΩ 1/4W ±5%
		01X0-016-735	PC Board	
		01X0-016-736	LED Plate	
		01X0-016-737	Heat Sink	
	X01	01X0-017-001	Transistor	Power Regulator
		01X0-016-993	PC Board Assembly	See PCB Part List
		01X0-016-994	PC Board Assembly	See PCB Part List
		01X0-016-738	PVC Sheet	

8.2.5 Camera Cable

Exploded View No.	Identification No.	Part No.	Part Name	Remarks
		01X0-016-214	Camera Cable (12pin/10pin)	For portable (3m)
		01X0-016-215	12-pin Plug	
		01X0-016-216	10-pin Plug	
		TA-097B	Extension Camera Cable	12pin/12pin (10m)
		01X0-016-215	12-pin Plug	
		01X0-016-217	12-pin Jack	
		01X0-017-026	Camera Cable (10pin/branches)	Included with AC Adaptor (3m)
		01X0-017-027	10-pin Jack	

8.2.6 Filter (3V06)

Exploded View No.	Identification No.	Part No.	Part Name	Remarks
		01X0-016-218 01X0-016-219	Filter Filter Case Assembly	

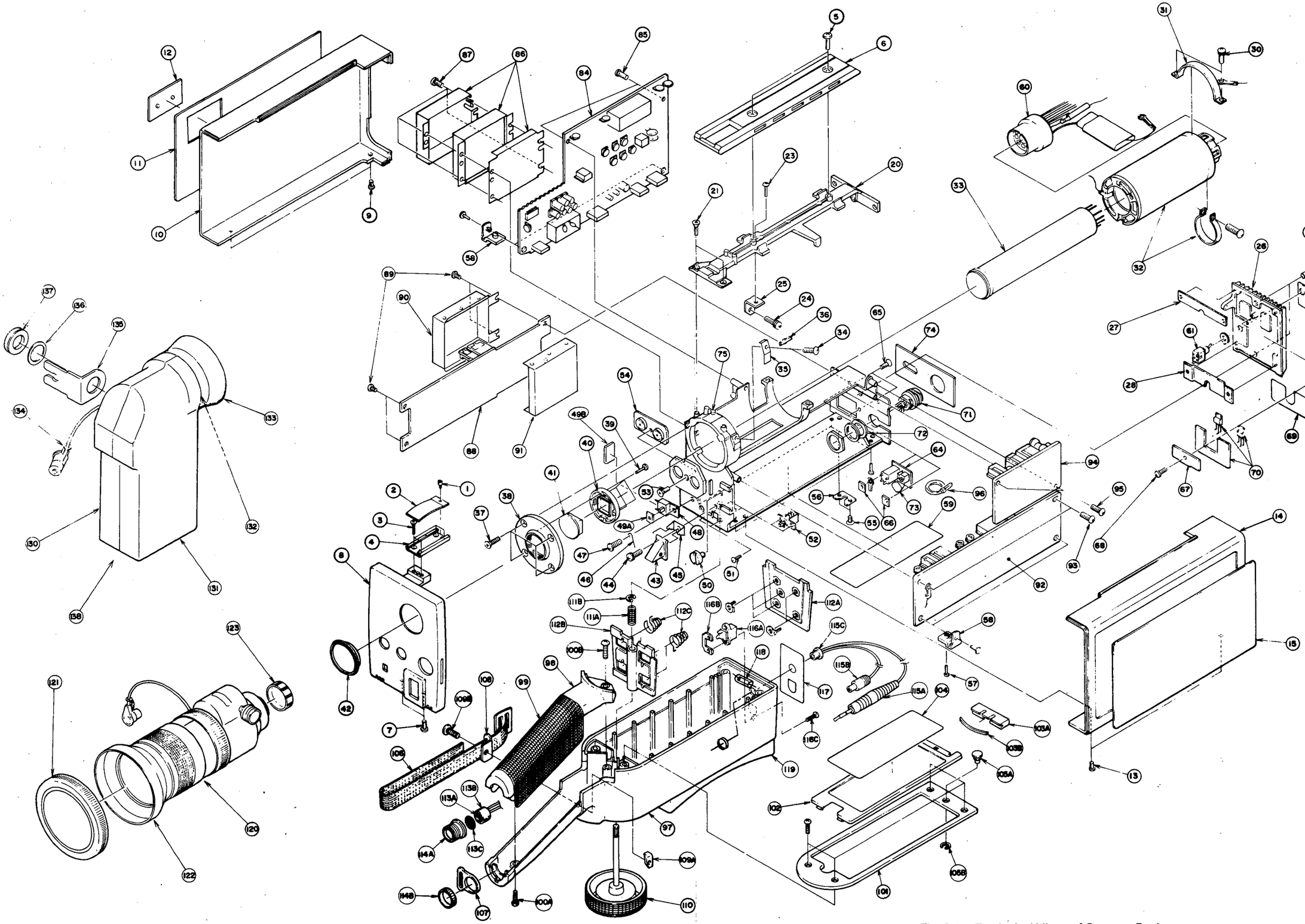


Fig 8.1 Exploded View of Camera Body

8.3 AC ADAPTOR (3V07A)

Identification No.	Part No.	Part Name	Remarks	
F9001	01X0-011-057	Fuse (2.0A)		
X9001	01X0-017-001	Si Transistor		
X9002	01X0-017-001	Si Transistor		
D9008	01X0-017-002	LED	Red	
D9001	01X0-017-003	Si Diode		
	01X0-017-004	DC Out Jack		
	01X0-017-005	Rear Plate		
	01X0-017-006	Case		
	01X0-017-008	Power Cord		⚠
	01X0-017-007	Cover		
T01	01X0-017-009	Power Transformer		⚠
	01X0-017-010	Plate-L		
	01X0-017-999	PCB Assembly	CA 9007A Power Supply	⚠
	01X0-017-011	Foot	x4	
	01X0-003-652	AC Inlet		⚠
SW01	01X0-017-012	Power Switch		⚠
D9006	01X0-017-013	Si Diode Zener		
D9005	01X0-016-130	Si Diode		
SW02	01X0-017-014	Voltage Selector		⚠
	01X0-017-015	Cable Clamp		
	01X0-017-016	LED Bracket		
	01X0-017-017	LED Bushing		
	01X0-017-018	Heat Sink 'A'	for X9001	
	01X0-017-019	Heat Sink 'B'	for X9002	
	01X0-017-020	Transistor Band	×2	
	01X0-017-021	CMF Resistor	0.68Ω, 1W	
	01X0-017-022	CMF Resistor	0.47Ω, 2W	
	01X0-017-023	CMF Resistor	330Ω, 2W	
	01X0-017-024	Ceramic Capacitor	4700pF 150V	
	01X0-017-025	Electrolytic Capacitor	4700μF 35V	
	01X0-017-026	Camera Cable (10pin/branches)	3V07B (3m)	
	01X0-017-027	10 Pin Jack		
	01X0-013-071	Tap Screw	×4	
	22X4941	Tap Screw	×4	
	01X0-013-061	Mica Sheet	×2	
	01X0-003-768	Screw	×2	
	01X0-016-170	Harness Band	×5	

8.4 PRINTED CIRCUIT BOARD ASSEMBLIES

8.4.1 Video Process (CA 1501A)
(For Camera Body)

In the following, reference should be made to the Video Process PCB components layout, shown in Figure 8.2.

Symbol	Part No.	Rating	Remarks
VARIABLE RESISTORS			
VR1001	01X0-016-063	1MΩ	SHADING CORRECTION
VR1002	01X0-016-067	6.8KΩ	OB ADJ
VR1011	01X0-016-067	6.8KΩ	AGC
VR1012	01X0-016-062	10KΩ	PEDESTAL SET
VR1013	01X0-016-068	680KΩ	Y-γ ADJ
VR1021	01X0-016-064	22KΩ	Y SET UP
VR1022	01X0-016-065	330Ω	Y GAIN
VR1031	01X0-016-055	1KΩ	LOW γ SET
VR1032	01X0-016-057	22KΩ	LOW SET UP
VR1033	01X0-016-056	2.2KΩ	LOW GAIN
VR1041	01X0-016-066	470Ω	(2R+B) GAIN
VR1052	01X0-016-054	100Ω	(2B+R) γ SET
VR1053	01X0-016-059	680Ω	B GAIN
CAPACITORS			
C1007	01X0-016-171	6.8μF 10V M	Tan. Cap
C1006	01X0-016-172	22μF 6.3V M	Tan. Cap
C1016	01X0-016-173	24pF 50V J	C. Cap
C1031	01X0-008-268	22pF 50V J	C. Cap
C1032	01X0-016-174	390pF 50V H	C. Cap
C1033	01X0-016-175	300pF 50V H	C. Cap
C1041	01X0-008-268	82pF 50V J	C. Cap
C1043	01X0-016-176	7pF 50V J	C. Cap
C1044	01X0-016-177	12pF 50V J	C. Cap
C1045	01X0-003-596		Trimmer Cap (PHASE SET)
C1046	01X0-016-178	150pF 50V	Mica Cap
C1047	01X0-016-179	33μF 10V M	Tan. Cap
C1051	01X0-016-180	120pF 50V	Mica Cap
C1054-5	01X0-016-181	100pF 50V J	C. Cap ×2
C1061	01X0-016-180	120pF 50V	Mica Cap
C1065-6	01X0-016-182	58pF 50V J	C. Cap ×2
C1071	01X0-016-183	47μF 6.3V A	BPE. Cap

Symbol	Part No.	Rating	Remarks
TRANSFORMERS			
T1011	01X0-016-184		3.5MHz Trap
T1012	01X0-016-185		7.2MHz Trap
T1013	01X0-016-186		3.7MHz Trap
T1031	01X0-016-112		Delay ADJ
T1041	01X0-016-113		1.8MHz Trap
T1042	01X0-016-187		3.6MHz Boost
T1043	01X0-016-188		7.2MHz Boost
T1044	01X0-016-189		10.4MHz Boost
COILS			
L1001	01X0-003-079	100μH	Peaking
L1011	01X0-003-848	68μH	Peaking
L1021	01X0-003-075	56μH	Peaking
L1031	01X0-016-190	180μH	Peaking
L1041	01X0-016-191	27μH	Peaking
L1042-3	01X0-003-848	68μH	Peaking ×2
L1051	01X0-016-192	1000μH	Peaking
L1061	01X0-016-193	680μH	Peaking
DIODES			
D1001	00X1-071		
D1011-5	01X0-003-036		×5
D1021-3	01X0-003-036		×3
D1031-2	01X0-003-036		×2
D1051-2	01X0-016-099		×2
D1053-4	01X0-003-036		×2
D1061-2	01X0-016-099		×2
D1063-4	01X0-003-036		×2
D1081-3	01X0-016-098		×3

Symbol	Part No.	Rating	Remarks
TRANSISTORS			
X1001	01X0-003-054		
X1002	00X5-474-153		
X1003	01X0-003-057		
X1004	01X0-003-054		
X1005	01X0-016-033		
X1011-2	01X0-003-057		×2
X1013-4	01X0-003-037		×2
X1021	01X0-003-057		
X1022	01X0-003-037		
X1023	01X0-003-057		
X1024	01X0-003-037		
X1025	01X0-003-057		
X1026	01X0-003-037		
X1031	01X0-003-057		
X1032-3	01X0-003-037		×2
X1041-3	01X0-003-057		×3
X1051-3	01X0-003-057		×3
X1054	01X0-003-037		
X1055	01X0-003-057		
X1061-3	01X0-003-037		×3
X1064	01X0-003-057		
X1071-2	01X0-003-037		×2
X1073	01X0-003-057		
X1074	01X0-003-037		
X1075-6	01X0-003-057		×2
X1081	01X0-003-056		
X1082	01X0-003-057		
X1083	01X0-016-027		
IC			
IC1011	01X0-016-040		
MISCELLANEOUS			
TH1001	01X0-016-115		Thermistor
TH1041	01X0-016-117		Thermistor
TH1081	01X0-016-116		Thermistor
DL1021	01X0-016-080	A76016	Delay line
	01X0-016-194		Shield Cap
	01X0-016-195		Shield Case
	01X0-016-196		Shield Cap

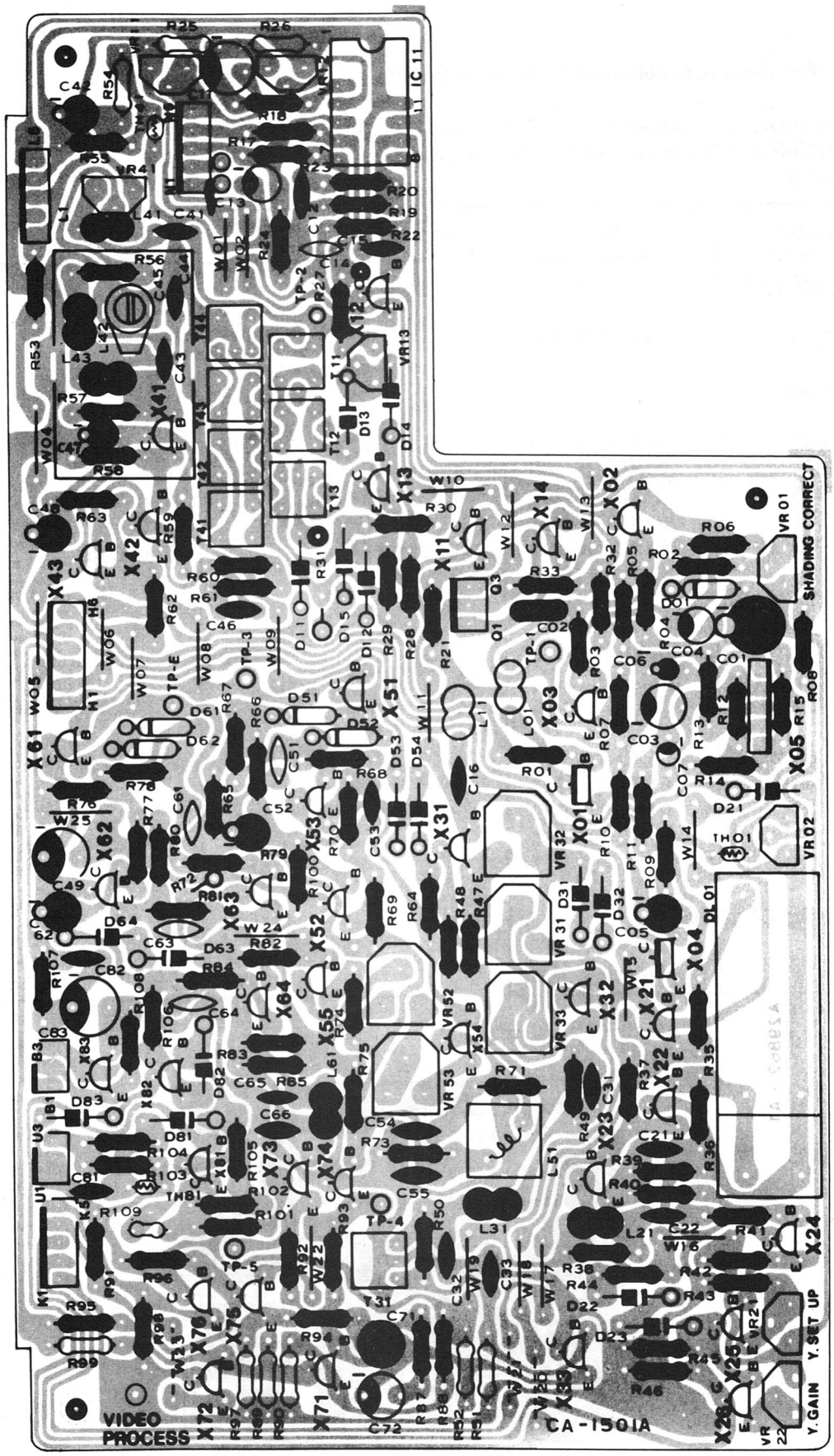


Fig. 8.2 Video Process PCB (CA 1501A) Components Layout

8.4.2 **Pre Amp (CA 2001A)** (For Camera Body)

In the following, reference should be made to the Pre Amplifier PCB components layout, shown in Figure 8.3.

Symbol	Part No.	Rating	Remarks
RESISTOR			
R2013	01X0-016-197	1KΩ	MF. R
CAPACITORS			
C2003	01X0-016-198	100μF 3.15V M	Tan. Cap
C2004	01X0-016-199	4pF 50V H	C. Cap
C2005	01X0-016-200	1μF 25V M	Tan. Cap
C2007	01X0-016-201	68pF 50V H	C. Cap
C2008	01X0-016-202	10μF 25V M	Tan. Cap
COIL			
L2001	01X0-016-127		Percibal Coil
TRANSISTORS			
X2001-2	01X0-016-037		FET ×2
X2005	01X0-016-028		
X2006	01X0-016-032		
X2007	01X0-003-057		
X2008	01X0-003-037		
MISCELLANEOUS			
	01X0-016-203		Connector Assembly

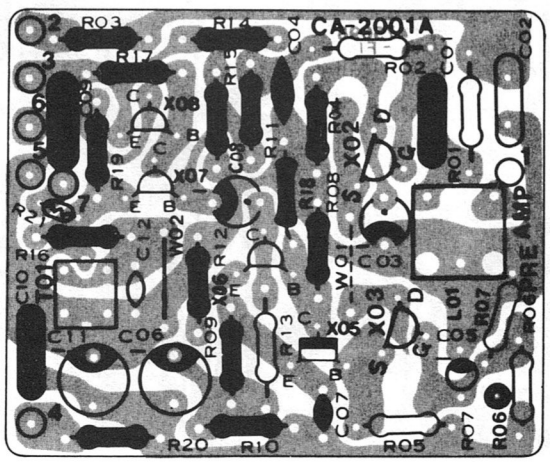


Fig 8.3 Pre Amplifier PCB (CA 2001A) Components Layout

8.4.3 SSG and Encoder (CA 3501A)
(for Camera Body)

In the following, reference should be made to the SSG and Encoder PCB components layout, shown in Figure 8.4.

Symbol	Part No.	Rating	Remarks
VARIABLE RESISTORS			
R3026	01X0-016-061	1KΩ	
R3027	01X0-016-061	1KΩ	
R3032	01X0-016-055	1KΩ	
R3035	01X0-016-060	6.8KΩ	
R3042	01X0-016-058	5.0KΩ	
R3055	01X0-016-059	680Ω	
CAPACITORS			
C3005	01X0-016-204	10μF 16V M	BPE. Cap
C3006	01X0-003-596		Trimmer Cap
C3012	01X0-016-205	10μF 10V A	E. Cap
C3033	01X0-016-206	47μF 10V A	E. Cap
C3051	01X0-016-207	4.7μF 10V M	Tan. Cap
C3029	01X0-016-208	47μF 6.3V A	Tan. Cap
TRANSFORMERS			
T3001	01X0-016-126		OSC
T3021	01X0-016-125		Band Pass
DIODES			
D3001	01X0-016-101		Varicap
D3002	01X0-016-101		Varicap
TRANSISTORS			
X3001	01X0-016-034		
X3021-2	01X0-003-054		×2
X3023	00X5-474-153		
X3024-6	01X0-016-034		×3
X3051	01X0-011-033		
X3052	01X0-003-849		
X3053	01X0-011-033		
X3054	01X0-003-849		
IC			
IC3001	01X0-016-044		
IC3021	01X0-016-041		
IC3022	01X0-016-041		
IC3051	01X0-016-045		
MISCELLANEOUS			
Y3001	01X0-016-124		Crystal

8.4.4 Deflection and Power (CA 4501A)
(For Camera Body)

In the following, reference should be made to the Deflection and Power PCB components layout, shown in Figure 8.5.

Symbol	Part No.	Rating	Remarks
VARIABLE RESISTORS			
R4004-5	01X0-016-069	20Ω	×2 H LIN, H CENT
R4010	01X0-016-075	680KΩ	TARGET
R4012	01X0-016-073	1MΩ	BIAS
R4018	01X0-016-073	1MΩ	8V ADJ
R4032	01X0-016-072	100KΩ	HEIGHT
R4042	01X0-016-074	470Ω	V CENT
R4075	01X0-016-053	500Ω	FOCUS
R4081	01X0-016-071	1KΩ	9V ADJ
RESISTORS			
R4017	01X0-016-108	100KΩ	Plate. R ⚠
R4072-4	01X0-016-104	10Ω	Plate. R ×3 ⚠
R4076	01X0-016-111	47KΩ	Plate R ⚠
R4080	01X0-016-110	2.2KΩ	Plate R ⚠
R4082	01X0-016-109	12KΩ	Plate R ⚠
R4084	01X0-016-107	10KΩ	Plate R ⚠
CAPACITORS			
C4002	01X0-016-129	0.0024μF 200V	PS. Cap
C4004	01X0-016-209	33μF 16V M	Tan. Cap
C4005	01X0-016-210	33μF 16V M	Tan. Cap
C4006	01X0-016-211	47μF 16V M	Tan. Cap
C4009	01X0-016-128	0.047μF 630V K	MPP. Cap
C4020	01X0-016-212	10μF 16V M	Tan. Cap
C4053	01X0-016-213	0.001μF 50V J	PP. Cap ⚠
TRANSFORMER			
T4001	01X0-016-083		HVT Assembly ⚠
COILS			
L4001	01X0-016-122		Linearity
L4002	01X0-016-121		Centering
L4003	01X0-016-123		Inductor
DIODES			
D4001	00X5-273		
D4002-4	01X0-016-096		×3
D4005	01X0-016-100		
D4032	01X0-016-130		Zener
D4033-4	01X0-003-036		×2
D4071	01X0-016-097		Zener
D4072	01X0-016-131		

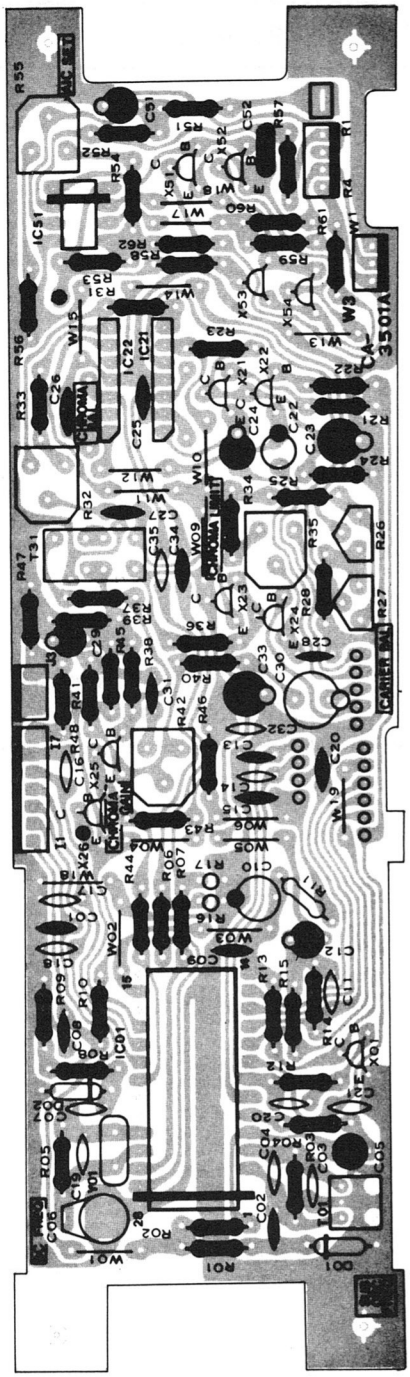


Fig 8.4 SSG and Encoder PCB (CA 3501A) Components Layout

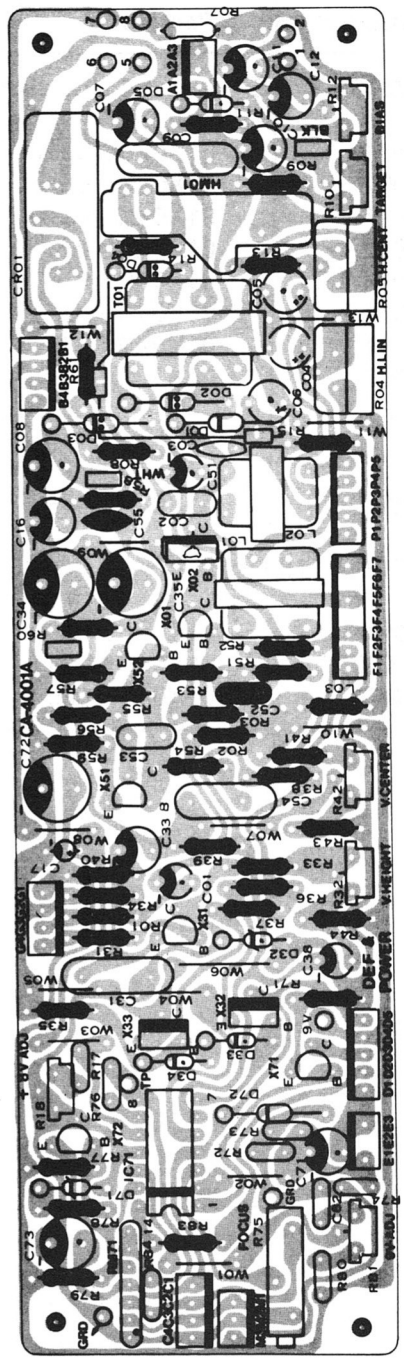


Fig 8.5 Deflection and Power PCB (CA 4501A) Components Layout

Symbol	Part No.	Rating	Remarks
TRANSISTORS			
X4001	01X0-016-031		
X4002	01X0-016-036		
X4031	01X0-016-031		
X4032	01X0-016-035		
X4033	01X0-016-030		
X4051-2	01X0-016-031		×2
X4071	01X0-016-031		
X4072	00X5-474-153		
IC			
IC4071	01X0-016-046		
MISCELLANEOUS			
RM4071	01X0-016-079		Resistor Module ⚠
HM4001	01X0-016-084		HV Module Assembly ⚠
CR4001	01X0-016-085		RC Block Assembly ⚠

8.4.5 **Auxiliary (CA 5501A)** (for Camera Body)

In the following, reference should be made to the Auxiliary PCB components layout, shown in Figure 8.6.

Symbol	Part No.	Rating	Remarks
VARIABLE RESISTOR			
R5042	01X0-016-055	1KΩ	
RESISTOR			
R5043	01X0-016-114	20KΩ	Thermistor
CAPACITORS			
C5001	01X0-016-206	47μF 10V A	E. Cap
C5003	01X0-016-206	47μF 10V A	E. Cap
C5042	01X0-008-290	10μF 16V M	Tan. Cap
C5053	01X0-008-290	10μF 16V M	Tan. Cap
COILS			
L5041	01X0-016-105		H WIDTH
L5042	01X0-016-106		Linearity
FUSIBLE			
F5001	01X0-016-026	1.6A	⚠
TRANSISTORS			
X5031-2	01X0-003-057		×2
X5033	01X0-003-037		
X5041	00X5-474-153		
IC			
IC5001	01X0-016-047		

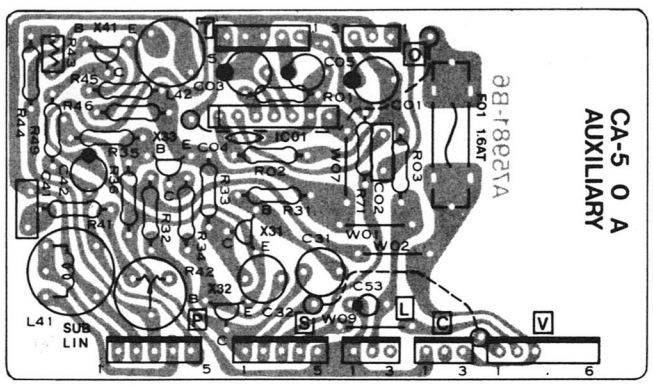


Fig 8.6 Auxiliary PCB (CA 5501A)
Components Layout

8.4.6 Power and Focus Regulator (CA 9501A)
(for Camera Body)

In the following, reference should be made to the Power and Regulator PCB components layout, shown in Figure 8.7.

Symbol	Part No.	Rating	Remarks
X01	01X0-016-029		Transistor (Power Reg.)
X02	01X0-016-029		Transistor (Focus Reg.)

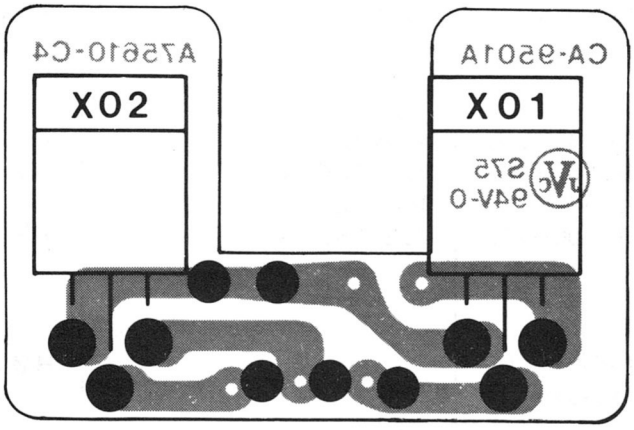


Fig 8.7 Power and Focus Regulator PCB (CA 9501A) Components Layout

8.4.7 Horizontal Deflection (CA 6001A)

(for Electronic Viewfinder)

In the following, reference should be made to the Horizontal Deflection PCB components layout, shown in Figure 8.8.

Symbol	Part No.	Rating	Remarks	
RESISTORS				
R6049	01X0-016-739	10KΩ 1W J	OMR	
R6050	01X0-016-740	470KΩ ½W 1%	CMF R	
R6052	01X0-016-741	1MΩ ½W 1%	CMF R	
R6053	01X0-016-741	1MΩ ½W 1%	CMF R	
R6054	01X0-016-742	820KΩ ½W 1%	CMF R	
R6042	01X0-016-720	150Ω	Thermistor	
VARIABLE RESISTORS				
R6041	01X0-016-716	2.2KΩ	H HOLD	
R6051	01X0-016-075	680KΩ	FOCUS	
R6072	01X0-016-712	2.2KΩ	CONT	
R6078	01X0-016-713	4.7KΩ	BRIGHT	
CAPACITORS				
C6037	01X0-016-743	1μF 50V A	BPE. Cap	
C6040	01X0-016-744	0.0082μF 150V	PP Cap	
C6045	01X0-016-745	1500pF 500V K	C. Cap	
C6046	01X0-016-744	0.0082μF 50V	PP. Cap	
C6073	01X0-016-746	1000pF 500V K	C. Cap	
COILS				
L6031	01X0-016-721		Line Coil	
L6071	01X0-003-068	12μH	Peaking	
L6072	01X0-016-190	180μH	Peaking	
TRANSFORMER				
T6031	01X0-016-718		HVT	⚠
HV MODULE				
HM6031	01X0-016-719			⚠
DIODES				
D6031	01X0-003-036			
D6032	00X5-273			
D6033	01X0-016-100			
D6071	01X0-003-036			
D6072	01X0-003-036			

Symbol	Part No.	Rating	Remarks
TRANSISTORS			
X6031	00X5-474-153		
X6032	01X0-016-700		
X6033	01X0-016-702		
X6071	01X0-016-034		
X6072	01X0-016-701		
X6073	00X5-474-153		
X6074	01X0-016-034		
X6075	00X5-474-153		
IC			
IC6031	01X0-016-704		

8.4.8 Vertical and Power (CA 7003A)

(for Electronic Viewfinder)

In the following, reference should be made to the Vertical and Power PCB components layout, shown in Figure 8.9.

Symbol	Part No.	Rating	Remarks
VARIABLE RESISTORS			
R7002	01X0-016-061	1KΩ	V LIN
R7005	01X0-016-714	33KΩ	V HOLD
R7008	01X0-016-062	10KΩ	V HEIGHT
CAPACITOR			
C7002	01X0-016-747	4.7μF 16V M	Tan. Cap
DIODES			
D7001	01X0-011-038		Zener
D7002	01X0-016-725		Zener
IC			
IC7001	01X0-016-708		
FUSIBLE			
F7001	01X0-003-653	1A	⚠

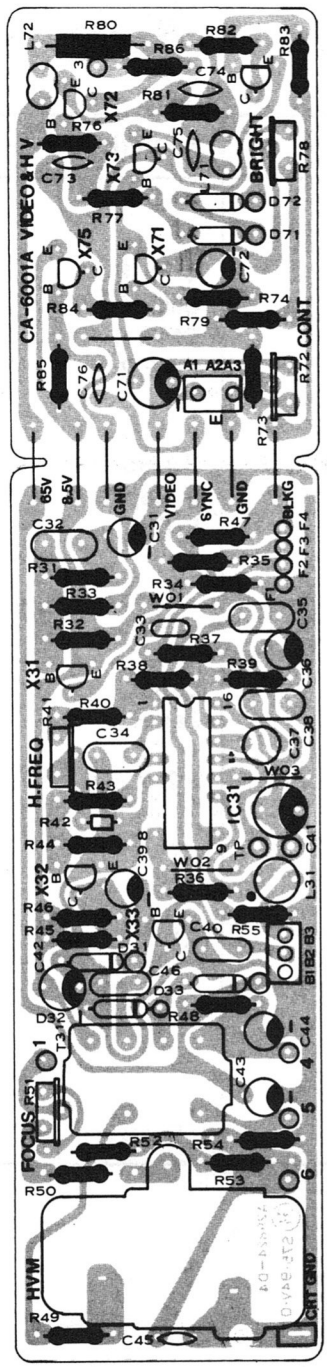


Fig. 8.8 Horizontal Deflection PCB (CA 6001A) Components Layout

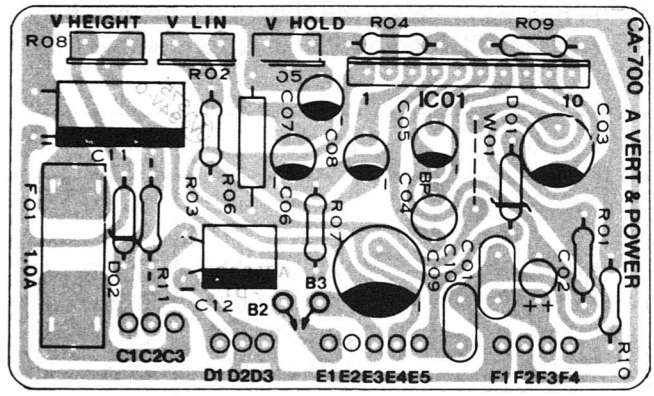


Fig 8.9 Vertical and Power PCB (CA 7003A) Components Layout

8.4.9 AC Adaptor (CA 9007B)

In the following, reference should be made to the AC Adaptor PCB components layout, shown in Figure 8.10.

Symbol	Part No.	Rating	Remarks
RESISTORS			
R9003	01X0-017-021	0.68Ω 1W J	CMF. R
R9004	01X0-017-021	0.68Ω1W J	CMF. R
R9005	01X0-017-022	0.47Ω 2W J	CMF. R
R9014	01X0-017-023	330Ω 2W J	CMF.R
CAPACITORS			
C9001	01X0-017-024	0.0047μF AC 150V H	C. Cap
C9002	01X0-017-025	4700μF 35V	E. Cap
C9003	00X4-814-210	10μF 25V A	E. Cap
DIODES			
D9001-4	01X0-017-003		×4 ⚠
D9005	01X0-016-130		Zener
D9006	01X0-017-013		Zener
D9007	01X0-003-036		
D9009-10	01X0-003-036		×2
TRANSISTORS			
X9003	01X0-011-033		
X9004-6	01X0-003-054		×3
X9007	01X0-011-033		
X9008	01X0-016-029		
FUSIBLE			
F9001	01X0-011-057	2A	⚠

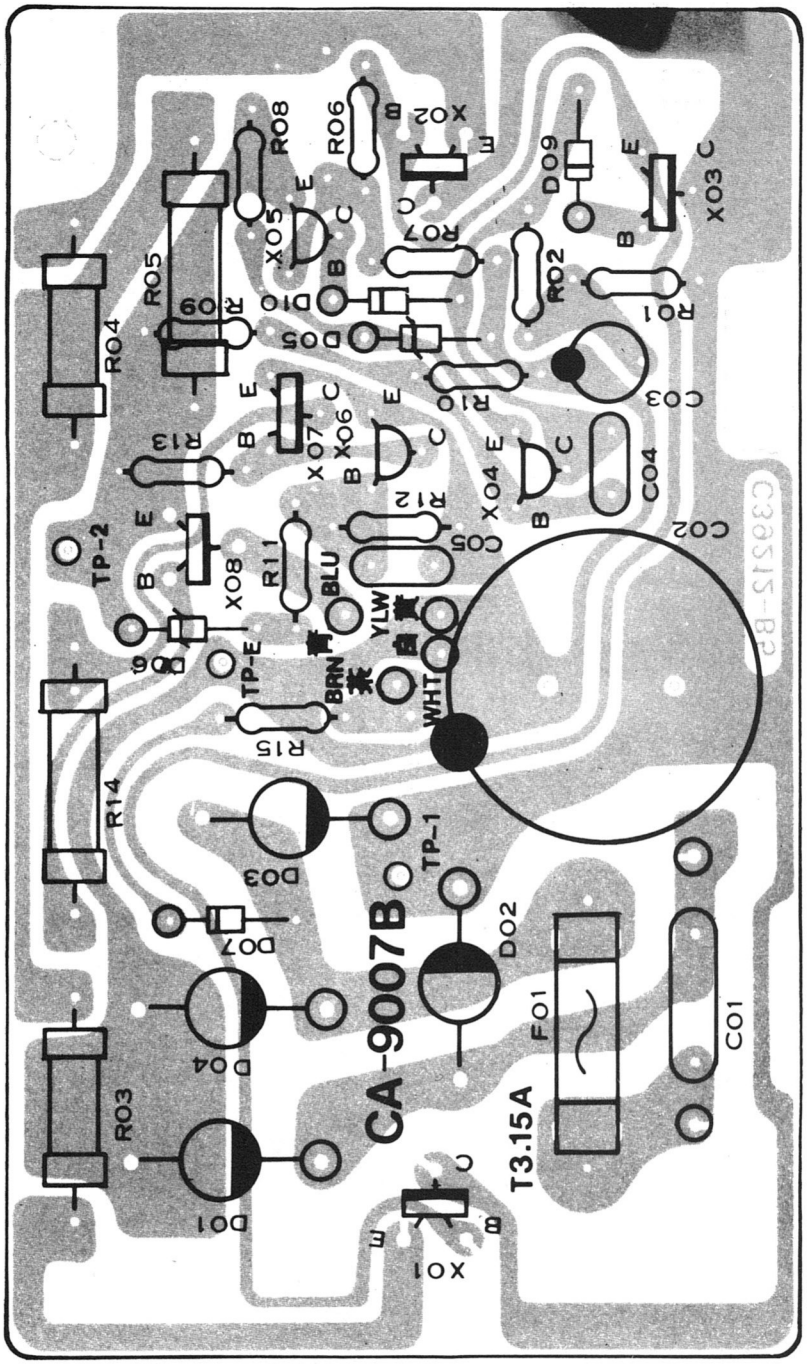


Fig 8.10 AC Adaptor PCB (CA 9007B)
Component Layout

H1 BGP
H2 H.D
H3 BEAM BLK
H4 B.F.P
H5 BLK
H6 CLAMP PULSE
L1 9V
L3 9V
L5 AUTO IRIS
B2 45V
B3 K
K5 Y-B
K4 R-Y
K3 Y
K2 O.B.C
L5 L4 L3 L2 L1
B3 B2 B1
H1 H2 H3 H4 H5 H6 N2
OB ADJ
X05 2SC2259
X02
X03
X04 2SC458 K
X83 2SA564A
X82
X81
X21 2SC829
X22 2SA564
X23 2SC829
X24
X25 2SC829
X24,X26 2SA564
X26
X25
VR02 8.6K
VR21 22K
VR22 330
Y GAIN
Y SET UP
DL21 0.95μs
R102 1.8K
X03 2SC829
X12 2SC829
X11 2SC829
X13 2SA564
X14 2SA564
X31 2SC829
X81 2SC828A
X32 2SA564
X31
X33 2SA564
X71 2SA564
X72 2SA564
X74 2SA564
X73 2SC829
X75 2SC829
X76 2SC829
X72
X74
X75
X76
LAG CONPEN
X82 2SC827
VR12 10K
VR13 680K
PEDESTAL SET
Y-B ADJ
LOW Y SET
LOW GAIN
LOW SET UP
DELAY ADJ
VR32 22K
VR33 2.2K
VR31
T11 3.5MHz
T12 7.2MHz
T13 3.7MHz
L31 180μ
T31 820μ
X42 2SC829
X43 2SC829
X41
X51 2SC829
X54 2SA564
X52 2SC829
X53 2SC829
X55 2SC829
X61 2SA564
X62 2SA564
X63 2SA564
X64 2SC829
VR52 100
VR53 680
T41 1.8MHz
T42
T43
T44
3.6MHz 7.2MHz 10.4MHz
PHASE SET
VR52 B MATRIX
B GAIN
X55 2SC829
POWER OFF ⟷ ON

CA-1501A
VIDEO PROCESS

CA-2001A
PRE AMP

X01 . X03
2SK136 (R)

X08 2SA564 (Q)
X07 2SC829 (C)
X06 2SC1906

X01 2SC458 K (C)
X02 2SA564 (R)

X05 2SA781

+24V
+9V
OUT
34V

SW02
OFF ⟷ ON
VCR SW

CA-5501A
AUXILIARY

X33
2SA564 (B)

X41
2SA564 (R)

X31,X32
2SC829 (C)

IC01
μPC592H2

H.SUBLIN
H.WIDTH

J02
MIC JACK

T1 VTR TRI
T2 AUDIO
T5 +12V IN

F01
1.6A

VRO1 SHADING CORRECTION

SW03
AGC

IC11 AN610

X41
2SC829 (C)

CA-1501A
VIDEO PROCESS

PHASE SET

J02
MIC JACK
C02 .022 MY
C04 47P
R02 56K
IC01
μPC592H2
1.9V
0.8V
0V
0V
0.8V
4.2V
9V
R01 18K
C01 47/10
C03 47/10
C05 10μ/16
03
02
01
H.SUBLIN
R35 2.7K
R33 2.2K
9V
X33
10.9V
R34 47K
R38 12K
C32 10/16 NP
0.1V
X32
X31
0.7V
R32 2.2K
C31 10/16 NP
13.3V
R31 47K
C53 10/16 TAN
X31,X32
2SC829 (C)
T1 VTR TRI
T2 AUDIO
T5 +12V IN
T1
T2
T3
T4
T5
F01 1.6A
X41
2SA564 (R)
4.7V
8.6V
R46 10
8.4V
R45 10K
R43 20K TH-N
R42 1K
R41 820
H.WIDTH
C42 10/16
R49 100
R44 27K
L42
C41 0.01MY
L41
P5 P4 P3 P2 P1
0.6V
V1 V2 V3 V4
C1 C2 C3
X41
2SC829 (C)
C43 7P
1.5V
C41 82P (UJ)
R56 1.8K
L42 68μ
L43 68μ
L41 27μ
470
VR41
C44 12P (UJ)
R57 2.2K
C45 30P
TH41 8K
C42 10μ/16
R54 4.7K
R55 5.6K
(2R+B)GAIN
CA-1501A
VIDEO PROCESS
PHASE SH
VIDEO
E
E
12V
J04
TARGET
P1 P2 P3 P4 P5
X01
2SC1685 (R)
X02
2SD781
L01
R15 1.6K
9V
G1
E
G2
C.HD
G3
C.VD
G4
0.9V
R01 1K
R02 100K
R03 560
D01 V08-C
8V
0.7V
C01 1/50
-3.2V
X02
X01
C03 390
C02 .0024
C06 33/16 TAN
L02
R04 20
C04 33/16 TAN
H.LIN
0.2V
R51 47K
C51 1/50
C53 0.001PP
2.1V
0.7V
R56 33K
X52
2SC1685 (R)
C55 47P
28V
R53 3.3K
X51
2SC1685(R)
0.1V
R69 680
R58 33K
R52 47
C52 0.015 MY
1.3V
R60 2.2M
R55 680K
X52
1.4V
+9V
R67 2.7K
E
R13 27
R44 10K
R54 220K
C54 0.1MY
R31 10K
C32 4.7/25
R32 100K
HEIGHT
R33 220K
0.2V
X31
2SC1685 (R)
4.6V
D32 RD7.5E
5.4V
5.4V
6
7
5
1S2473H
1S2473H
8V
X32
D33
D34
5.3V
R36 330
R37 5.2V
4.8V
X33
R38 330
R39 10
C33 47/10
R40 5.6K
(8.5V)
R35 2.2K
CA-4501A
DEF. &
POWER
R34 5.6K
X32 2SD571 (L)
X33 2SB605 (L)
92V
C07 1/160
D02 V09-E
R09 82K
TARGET
R11 56K
35V
R10 1M
C10 1/160
R12 1M
BIAS
D05 1SS81
C11 1/160
-95V
C12 1/160
CR01
TO1
HM01
1M
600V
R08 27K
D04 V09-E
310V
D03 V09-E
24V
R14 100
R61 1K
C09 .047/630 MP
.047/1250V
+24V
C08 100/25
24V
8V
R18 1M
R17 100K
8VADJ
C17 10/16 TAN
C16 4.7/50
8.0V
6.7V
R05 20
H.CENT
L03 18μH
C06 47/16 TAN
R76 47K
R07 1Ω
12V
R41 180
R42 470
R43 270
V.CENT
C34
C35
470/6.3
470/6.3
C72 470/10
C73 100/25
11.2V
X71
4.5V
0.7V
R75 500
R
MOD
-UL
FOCUS
D71 02Z6.2A
R84 10K
RM71
R77 1K
R79 270
6.9V
X72
R78 270
R80 2.2K
7.5V
9.2V
R81 1K
9VADJ
R82 12K
R83 560
IC71
D72 W08 -A
C71 47/10
0.7V
R71 2.2K
R72 10 WR
R73 10 WR
R74 10 WR
120K TH-N
V01
S4077C
A1
A2
A3
B4 B3 B2 B1
+45V
M1
M2
M3
C4
C3
C2
C1
E
9V
E
12V
J05
R4
R3
R2
R1
R1 R2 R3 R4
W1 W2
R53 5.6K
R57 2.2K
7V
R54 1.8K
IC51
LM358 1/2
X51
R55 680
1.6V
7.5V
1.6V
X52
R56 1.8K
AIC SET
L5
R51 10K
R52 10K
C52 0.022 MY
C51 4.7/50
C21 330
X21
2SC458K
C22 0.47/50
0.3V
R21 3.3K
3.1V
C23 47/6.3
R22 3.3K
R24 1.2K
R25 3.3K
R23 2.2K
R26 1K
R28 1.8K
0.3V

T1 VTR TRI
T2 AUDIO
T5 +12V IN

C1 C2 C3

FO1 1.6A

X41 2SC829 (C)
X42 2SC829 (C)
X43 2SC829 (C)
X51 2SC829 (C)
X52 2SC829 (C)
X53 2SC829 (C)
X54 2SA564 (Q)
X52 2SC829 (C)
X55 2SC829 (C)

C41 82P (UJ)
L41 27μ
R56 1.8K
L42 68μ
L43 68μ
C43 7P
R57 2.2K
C44 12P (UJ)
C45 30P
R58 1.5K
C42 10μ/16
R54 4.7K
R55 5.6K
VR41
TH41 8K
470
(2R+B)GAIN
PHASE SET

R59 3.3K
C47 33/10 (T)
C49 220μ/10
R61 120
R60 120
C46 150P
T41 1.8MHz
T42
T43
T44
3.6MHz 7.2MHz 10.4MHz
R62 1.8K
R63 18K
C48 1/50

TP-3
TP-E
D52 ISS16
D51 ISS16
R100 560K
R66 6.8K
R68 100
R67 3.3K
R69 1.2K
R70 1.5K
C53 56
R65 1K
C51 120
C52 10μ/16
VR52 100
VR53 680
D53 1S 2473H
D54 1S 2473H
R64 180
R71 2.2K
R72 120K
R74 100
R73 2.7K
C54 100P (UJ)
C55 100P (UJ)
L61 1MH
B MATRIX
B GAIN

CA-1501A
VIDEO PROCESS

① B.G.P ② C.H.D ③ B.BLK
④ BFP ⑤ BLK ⑥ Clamp

TARGET

V01 S4077C
120K TH-N
CR01
C09 .047/630 MP
C12 1/160
R12 1M BIAS
R11 56K
A1 A2 A3
B4 B3 B2 B1
+24V +45V
600V
M1 M2 M3 C4 C3 C2 C1
E 9V E 12V

C17 10/16 TAN
C16 4.7/50
R76 47K
8.0V 6.7V

C73 100/25
R84 10K
RM71
R75 500
R77 1K
R79 270
R80 2.2K
R78 270
X72
R81 1K 9VADJ
R82 12K
R83 560
D71 02Z6.2A
IC71
FOCUS
R R MOD -UL

J05
R4 R3 R2 R1

R1 R2 R3 R4
W1 W2 W3
L5

R53 5.6K
R54 1.8K
R55 880
R56 1.8K
R57 2.2K
R58 88
R61 82
R61 27K
IC51 LM358 1/2
X51
X52
AIC SET
R59 8.2K
R60 10K
X53
X54
IC51 LM358 1/2
R51 10K
R52 10K
C52 0.022 MY
C51 4.7/50 (T)
X51.X53 2SC1213A
X52.X54 2SA673A

C21 330
X21 2SC458K (C)
C22 0.47/50
R25 3.3K
R23 2.2K
IC21 AN614
C25 0.01
R26 1K
R27 1K CARRIER BALANCE
IC22 AN614
R28 1.8K
R31 1.5K
R32 1K CHROMA BALANCE
R33 1.5K
C23 47/6.3
R21 3.3K
R22 3.3K
R24 1.2K

R02 10K
T01 23μH
R03 1M
SUB OSC FREQ
R04 3.3K
C03 39
C05 10μ/16 B.P
C04 68
C02 0.01
D01 ISV88
IC01 HD44007
C01 0.01
R05 1M
Y01
C07 0.01
C34 0.01
R16 100
R08 1.5K
R07 1.5K
S.C FREQ
C06
D02 ISV68
R08 100K
C08 0.01
R09 56K

X23 2SA564 (R)
C27 0.01
R36 3.3K
T31
R37 560
R38 470
R17 100
R34 8.2K
X24 2SC454 (C)
C36 0.01
CHROMA LIMITTER
C29 33/10 TAN
R39 18K

PHASE SET

3.6MHz 7.2MHz 10.4MHz

VR52 B MATRIX

B GAIN

X55 2SC829 (C)

X64 2SC829 (C)

① B.G.P ② C.H.D ③ B.BLK
④ BFP ⑤ BLK ⑥ Clamp

④ C.HD
③ C.VD
② GND
① 9V.IN

POWER OFF ↔ ON SW01

J01 EXT DC IN JACK

J03 12V VIDEO AUDIO VTR TRIG

I1 EXT DC F.CON
I2 fH CONTROL IN
I3 LINE SW P.IN
I4 D.VD IN
I5 D.HD OUT
I6
I7 VIDEO

J1 J2 J3

W1 W2 W3

X51.X53 2SC1213A
X52.X54 2SA673A

IC01 HD44007

IC21 AN614

IC22 AN614

CARRIER BALANCE

CHROMA BALANCE

CHROMA LIMITTER

S.C FREQ

SUB OSC FREQ

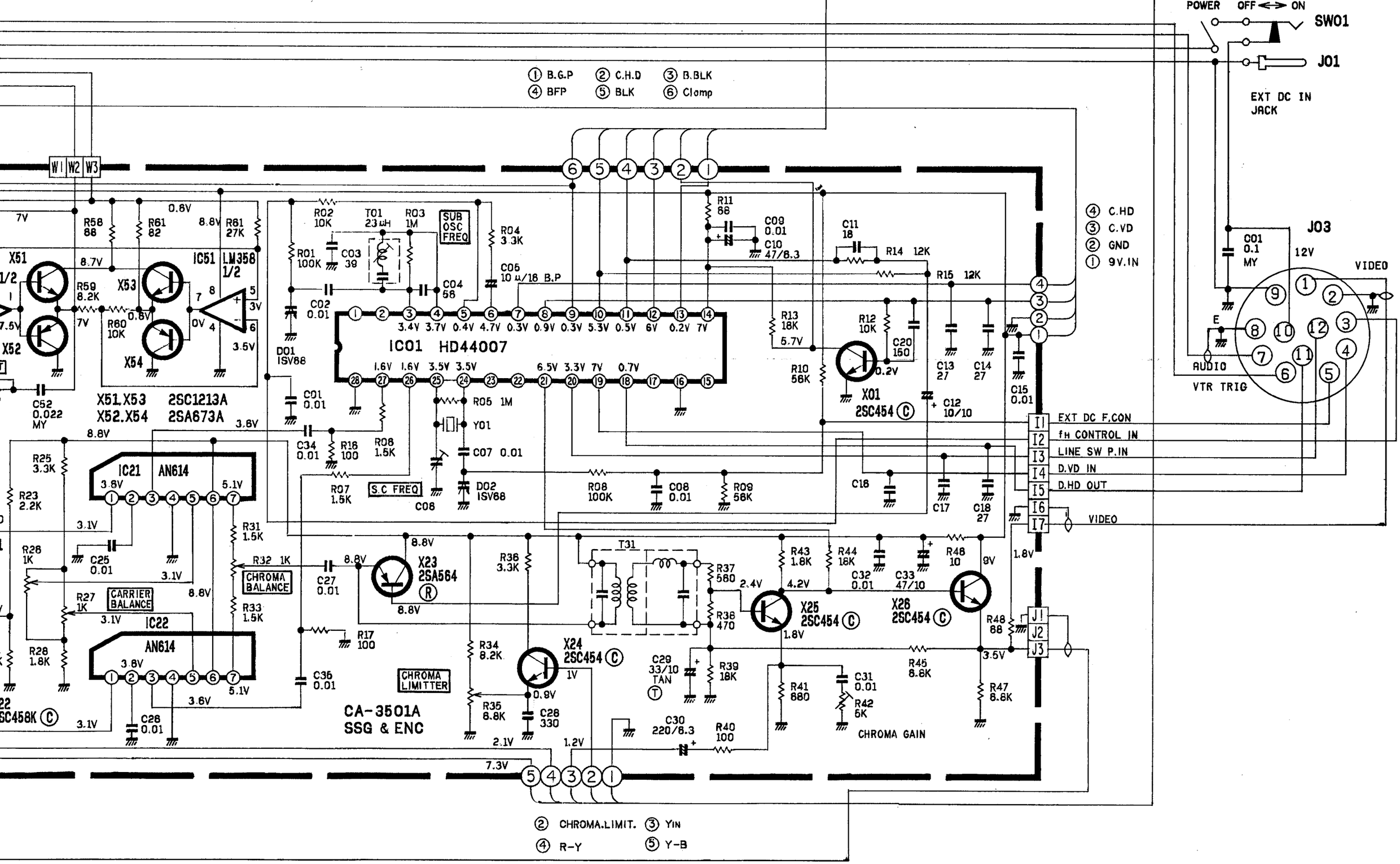


Fig 6.3

Camera 3V06A

Circuit Diagram

TARGET

R09 82K
TARGET
R11 56K
35V
R10 1M
C10 1/160
R12 1M
BIAS
D05 1SS81
C12 1/160
C11 1/160
-95V
CR01
HM01
1M
600V
D04 V09-E
310V
R14 100
R61 1K
C09 .047/630 MP
.047/1250V
+24V
24V
C08 100/25
8V
H.CENT
C06 47/16 TAN
R18 1M
R17 100K
8VADJ
C17 10/16 TAN
R76 47K
8.0V
6.7V
C16 4.7/50
+45V
B4 B3 B2 B1
M1 E
M2 9V
M3
C4 E
C3
C2
C1 12V
R07 1D
R41 180
R42 470
R43 270
C72 470/10
C73 100/25
R84 10K
RM71
R MOD -UL
FOCUS
R75 500
R77 1K
R79 270
R78 270
X72
R80 2.2K
IC71
R81 1K
9VADJ
R83 560
R82 12K
D71 02Z6.2A
D72 W06 -A
11.2V
4.5V
X71
0.7V
5.1V
6.9V
7.5V
8.2V
C71 47/10
R71 2.2K
R72 10 WR
R73 10 WR
R74 10 WR
7V
7.1V
E1 E2 E3
D1 D2 D3 D4 D5
9V
12V
FOCUS
X71 2SC1685 (R)
X72 2SA564 (R)
IC71 μPC324C
X02 2SB566
X01 2SB566
11.2V
CA-9501A
POWER & FOCUS
REGULATOR

J05
R4
R3
R2
R1

V01 S4077C
120K TH-N
A1
A2
A3

① B.G.P ② C.H.D
④ BFP ⑤ BLK

R1 R2 R3 R4
W1 W2 W3
6 5 4

R53 5.6K
R57 2.2K
7V
R58 68
0.6V
R61 82
8.8V
R61 27K
R54 1.8K
IC51 LM358 1/2
X51
8.7V
IC51 LM358 1/2
R55 880
R59 8.2K
X53
R56 1.8K
1.6V
7.5V
X52
7V
R60 10K
0.6V
0V
3.5V
AIC SET
X54
L5
R51 10K
R52 10K
C52 0.022 MY
C51 4.7/50
X51.X53 2SC1213A
X52.X54 2SA673A
3.6V
8.8V
C21 330
R25 3.3K
IC21 AN614
3.6V
5.1V
X21 2SC458K
C22 0.47/50
R23 2.2K
3.1V
R31 1.5K
R28 1K
C25 0.01
3.1V
R32 1K
CHROMA BALANCE
8.8V
C27 0.01
R27 1K
CARRIER BALANCE
3.1V
IC22
AN614
3.8V
5.1V
3.6V
R28 1.8K
R21 3.3K
0.3V
3.1V
C23 47/6.3
R22 3.3K
R24 1.2K
0.3V
X22 2SC458K (C)
C24 0.47/50
C26 0.01
C36 0.01
CHROMA LIMITTER
CA-3501A
SSG & ENC

R02 10K
T01 23μH
R03 1M
SUB OSC FREQ
R04 3.3K
R01 100K
C03 39
C05 10μ/16 B.P
C02 0.01
3.4V 3.7V 0.4V 4.7V 0.3V 0.9V 0.3V 5.3V 0.5V
IC01 HD44007
1.6V 1.6V 3.5V 3.5V 6.5V 3.3V 7V 0.7V
D01 1SV88
C01 0.01
R05 1M
Y01
C34 0.01
R16 100
R06 1.5K
C07 0.01
R07 1.5K
S.C FREQ
C08
D02 1SV88
R08 100K
T31
X23 2SA564 (R)
8.8V
R36 3.3K
R17 100
R34 8.2K
X24 2SC454 (C)
1V
0.9V
R35 6.8K
C28 330
2.1V
1.2V
7.3V

② CHROMA.LIMIT.
④ R-Y

J04

E
E
12V

TARGET

P1 P2 P3 P4 P5

9V
E
C.HD
C.VD
G1 G2 G3 G4

X01 2SC1685 (R) X02 2SD781

L01

R15 1.6K

R01 1K
R02 100K
R03 560
D01 V08-C
0.9V
0.7V
8V
C01 1/50
-3.2V
X02
X01
0.2V
C03 390
C02 .0024
C06 33/16 TAN
L02
R04 20
C04 33/16 TAN
H.LIN

R51 47K
C51 1/50
0.7V
C53 0.001PP
2.1V
R56 33K
X52 2SC1685 (R)
C55 47P
28V
R52 47
R53 3.3K
X51 2SC1685(R)
0.1V
R59 680
C52 0.015 MY
R60 2.2M
1.3V
R55 680K
X52 1.4V
R58 33K

R44 10K
R54 220K
C54 0.1MY
R67 2.7K
E
+9V
R13 27
R31 10K
C32 4.7/25
R32 100K
HEIGHT
12V
8V
X32
6
7
5
5.4V
5.4V
1S2473H
1S2473H
8V
5.3V
R36
R38 330
R39 10
R33 220K
0.2V
X31 2SC1685 (R)
4.6V
C31 .15/50
D32 RD7.5E
D33
D34
R37 5.2V
C33 47/10
R35 2.2K
4.8V
X33
R40 5.6K
(8.6V)
R34 5.6K

CA-4501A
DEF. &
POWER
X32 2SD571 (L)
X33 2SB605 (L)

F1 F2 F3 F4 F5 F6 F7

TH-N
8.2

DY01
V
H
10
FOCUS

92V
C07 1/160
D02 V09-E
R09 82K
TARGET
R11 56K
35V
R10 1M
C10 1/160
R12 1M
BIAS
D05 1SS81
-95V
C11 1/160
C12 1/160
CR01
TO1
HM01
R08 27K
D04 V09-E
310V
D03 V09-E
24V
R14 100
R61 1K
C09 .047/630 MP
C08 100/25
24V
8V
R05 20
H.CENT
C06 47/16 TAN
L03 18μH
R18 1M
R17 100K
8VADJ
C17 10/16 TAN
8V
R76 47K
8.0V
C16 4.7/50
6.7V
R07 10

R41 180
R42 470
R43 270
V.CENT
C34
C35
470/6.3
470/6.3
C72 470/10
C73 100/25
R84 10K
R75 500
RM71
R MOD -UL
FOCUS
11.2V
0.7V
5.1V
4.6V X71
0.7V
R77 1K
R79 270
6.9V
R78 270
X72
R80 2.2K
7.6V
R81 1K
9VADJ
R83 560
R62 12K
IC71
8.2V
7.5V
D72 W06 -A
C71 47/10
0.7V
R71 2.2K
R72 10 WR
R73 10 WR
R74 10 WR
D71 02Z6.2A

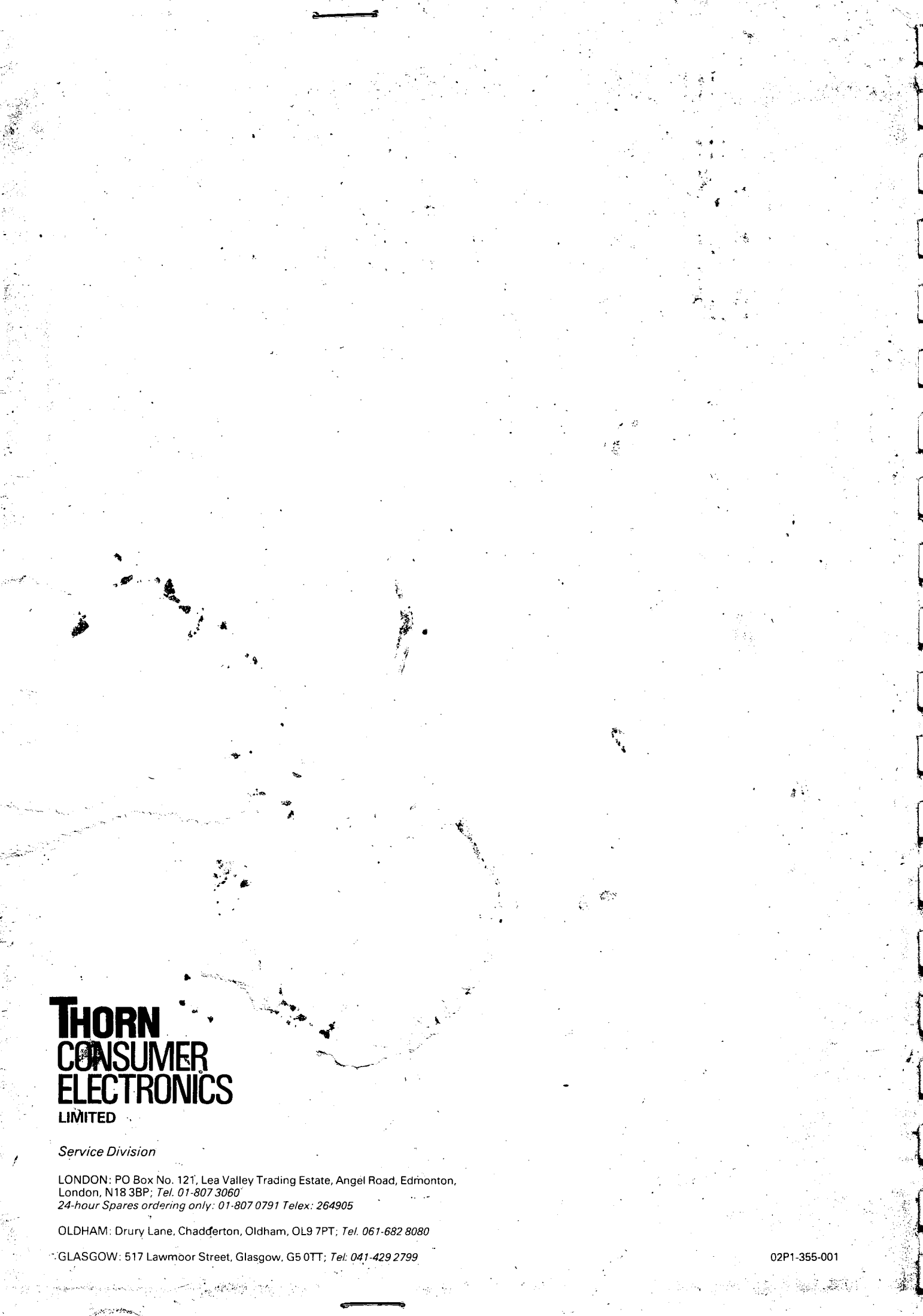
A1 A2 A3
120K TH-N
V01 S4077C
600V
1M
B4 B3 B2 B1
+45V
+24V
.047/ 1250V

M1 M2 M3 C4 C3 C2 C1
E
9V
E
12V

X71 2SC1685 (R)
X72 2SA564 (R)
IC71 μ PC324C
D1 D2 D3 D4 D5
7.1V
8V
12V
X02 2SB566
X01 2SB566
11.2V
CA-9501A
POWER & FOCUS
REGULATOR

JO5
R4
R3
R2
R1

R1 R2 R3 R4
W1 W2 W3
R53 5.6K
R57 2.2K
7V
R54 1.8K
R55 880
R56 1.8K
IC51 LM358 1/2
X51
1.6V
7.5V
X52
AIC SET
L5
R51 10K
R52 10K
C52 0.022 MY
C51 4.7/50
C21 330
X21 2SC458K
C22 0.47/50
0.3V
R21 3.3K
C23 47/6.3
3.1V
R22 3.3K
C24 0.47/50
X22 2SC458K
R25 3.3K
R23 2.2K
R26 1K
R27 1K
R24 1.2K
R28 1.8K



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